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APPENDICES

United States
Department of
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Forest
Service

Dixie
National
Forest

Environmental Impact Statement

FINAL

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DIXIE NATIONAL FOREST

LAND AND RESOURCE MANAGEMENT PLAN

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APPENDIX A

A. Issues, Concerns, and Opportunity Identification Process

In November, 1979, all of the unit plans on the Forest were reviewed and a list of preliminary issues and concerns prepared. This "chopping block" list of over 250 items was reviewed by the Staff and Rangers. Functional items from other plans and from the data files were added at this time. Subsequently, the Supervisor's Staff groups were asked to revise the list into a range of 30 to 40 important issues and concerns.

In the Spring of 1980, the Dixie NF Management Team, composed of the District Rangers and the primary Staff, used a set of screening criteria to further reduce the preliminary list to 12. The criteria were:

- Can the issue be resolved by the Forest Plan?
- Can the resolution wait until the Forest Plan is approved?
- Based on importance, is the issue in the top one-third of all the issues?

Descriptive statements were then prepared for each of the issues which received a "yes" answer to each of the screens. This material was reviewed by the Management Team before publishing as a public document.

In 1983, because of decisions by the U.S. District Court in California and Tenth Circuit Court of appeals which basically found the RARE II EIS inadequate, the Forest Service decided to re-evaluate the roadless areas and make wilderness allocations in the Forest Plan. Section 36 CR 219.17 of the planning regulations was modified. Subsequently, in the spring of 1983, the Dixie NF began a reinventory of all roadless areas on the Forest that would be used as a basis for planning and for public involvement activities.

Information, including maps, from unit planning and from RARE II was reassembled and updated. All previously identified areas were compiled along with some additional new areas that are contiguous to BLM and National Park Service potential wilderness areas.

Forty-one of the forty-three roadless areas so identified have been evaluated twice before. Public involvement was a part of each evaluation. The previous evaluations included RARE I, Unit Planning evaluation, and RARE II. The two areas not previously evaluated are small, irregular shaped roadless areas contiguous to BLM and Park Service lands. In addition, several areas that were previously evaluated are now contiguous to BLM and NPS lands with wilderness potential.

The purpose of public involvement activities in the re-evaluation was to update the issues and concerns for the previously identified roadless areas, including those that are now contiguous, and to develop the issues and concerns for the newly identified contiguous areas.

Public Involvement

The Notice of Intent to prepare an Environmental Impact Statement (which was published in the Federal Register in July, 1980) gave information on the planned public involvement for development of issues. The Notice of Intent was especially helpful in contacting or giving notice to agencies and organizations outside of the Dixie NF's usual zone of influence.

Paid newspaper announcements were published in newspapers within the Dixie's zone of influence, including the Las Vegas area. The announcement contained a list of the 12 preliminary issues and dates of "open houses."

An "Open House" was conducted at each Dixie NF Ranger Station during the period that public input was requested (July 17 to August 18, 1980). New releases announcing the dates of the "open house" were sent out to local newspapers. The management team identified over 300 individuals, organizations, and local governments be contacted for comments.

A briefing guide, containing the 12 identified preliminary issues with the issue statements, a response form, and a description of the Dixie NF, was prepared. The briefing guide was mailed to persons known to have an active interest. Certain individuals and organizations identified as "key" received the briefing guide and also had a personal discussion with the District Ranger or his representative. A one page announcement and summary of the planning process was sent to Forest permittees and other identified users.

Over 85 response forms, letters, or documented verbal comments were received as a result of these contacts.

Based on information supplied by the public, the response forms were categorized by geographical area and the relationship of the responder to the Forest. Of the 83 responses received by September 11, 1980, the categories and the number of responses from each are as follows:

Elected Officials	8 responses
Natural Resource Industry	11 responses
Governmental Agency	14 responses
Environmental Organizations	7 responses
Academic Community	1 response
Recreation User	13 responses
Concerned Citizen	23 responses
Other	6 responses

By geographic location, the responses were:

Iron County	10 responses
Kane County	4 responses
Wayne County	12 responses
Garfield County	16 responses
Washington County	14 responses
Piute County	2 responses
Las Vegas, Nevada	4 responses
State of Utah	7 responses
Arizona and Nevada	3 responses
National (Other parts of the U.S.)	11 responses

The Public Involvement Process for the 1983 Roadless Area Evaluation was similar. A notice of Intent that the Forest Plan EIS was going to be revised was published in the Federal Register on 9/22/83.

Newspapers and radio articles, along with an information packet mailed to the Forest Plan contact list, informed the public of dates for "open houses" and how they could get involved in the process.

In addition to a state-wide "open house" held in Salt Lake City on November 2-3, 1983, each of the Dixie's five Ranger Districts held an "open house" on November 29, 1983. The period for responses to be received was announced to end on January 6, 1984. There were short extensions for people who requested more time to prepare their response.

The 35 written responses received were categorized by geographic area and the relationship of the responder to the Forest. By geographical area the responses came from:

Local Counties	26 responses
State of Utah	4 responses
National	5 responses

By relationship to the Forest the responses were:

Elected Officials	2 responses
Natural Resource Industry	7 responses
Governmental Agency	2 responses
Environmental Organization	4 responses
Concerned Citizen	20 responses

Screening Process

A system similar to CODINVOLVE was used to process response forms. Each response form received a code number and each comment or suggestion on the form was given the same code. Thus the identity of each comment is retained.

Comments were grouped into either new proposed issues or comments on one of the twelve preliminary issues.

Management Concerns were identified by Rangers and Staff during this same period.

The final packet of public comment and management concerns was given to the Dixie NF Interdisciplinary Team to evaluate.

The ID Team established a set of criteria or screens with which to evaluate public comments and management concerns. The screens used were:

- Does the comment validate one of the preliminary issues, or is a new issue suggested? (If a new issue was suggested, the ID Team wrote the issue and it also became subject to the remaining screens.)
- Can the Forest Plan resolve the issue or concern, and is it relevant to the planning process?
- Will resolution affect the Dixie's activities?
- Is it not addressed by other planning agencies?
- Can resolution wait until the Forest Plan is completed?
- Is it significant as defined in 1508.27 of the CEQ Regulations?

Those issues or concerns that received a "yes" for the criteria were then considered to have been screened.

Approximately 40 issues and concerns survived the screening process. The ID team then synthesized and combined these into 14 major issues and concerns.

During the 1983 Roadless Areas Evaluation, the same screening process was used. The process resulted in two additional issues and concerns.

B. Consultation With Others

The initial phases of the coordination required in Section 219.8 were accomplished during the public involvement effort. The agencies and individuals were notified of the Forest Plan process. Their response to the preliminary issues was invited.

In addition to being notified during various steps of the planning process through the regular public involvement process, individual contacts were made to coordinate written plans of Federal, State, County agencies and Indian Tribes with the Forest Plan as shown in the following List:

Agencies Contacted	Plans Coordinated	How Considered in Forest Plan
Piute Indians	Reservation Plan	Formulation of Goals & Objectives
BLM	AMP'S, LUP'S	" " " " "
State of Utah-Lands and Forestry	State Resource Plan	" " " " "
State of Utah-Div. Wild. Res.	Herd Unit Plans	" " " " "
Garfield County	Planning & Zoning	" " " " "
Iron County	"	" " " " "
Kane County	" "	" " " " "
Washington County	" "	" " " " "
Piute County	" "	" " " " "
Wayne County	" "	" " " " "

Contacts were made with the Shivwits and Cedar City bands of Piute Indians during the legislative process to regain their tribal status and reservation lands. No Dixie NF land was involved in the final bill. The results of the contacts indicated that Dixie NF lands had significance only as hunting areas. No written records or tribal plans affecting Forest lands are known.

In addition to the formal public involvement efforts and formal consultation with others, the Forest has carried on a continuous public involvement program. Periodic meetings and correspondence has taken place with leaders in the industrial and environmental community and with local elected officials concerning Forest Plan issues and matters pertaining to Forest conduct.

C. Selected Issues, Concerns, and Opportunities

All of the issues and concerns were used in preparing the DEIS except for those dealing with roadless areas. The enactment of the Utah Wilderness Act of 1984 resolved the roadless area and wilderness issue prior to the issuance of the Forest Plan and DEIS.

The issues or concerns that were screened out were dealt with outside of the planning process.

Most issues are dealt with differently in each of the alternatives, but the issues which are treated the same way in all alternatives are as follows:

No. 2 Increased Demand - All alternatives examined in detail assumed that the demand for Forest outputs and services would not decline.

No. 12 Emphasis of Group Recreation Sites Over Single Family Recreation Sites - The importance of this issue faded during the planning process to the point that it appears unnecessary. Except for the initial public involvement effort, the issue was never raised again. The existing number of group sites is adequate for the immediate future and additional sites have been constructed off Forest.

The analysis of the Management Situation describes the ability of the Forest and its resources to respond to the issues, concerns and opportunities. The alternatives described in detail were selected and described to resolve the ICO's within the parameters of the benchmarks. While many of the ICO's appear to require tradeoffs for resolution, it was found this was not the case when they were mitigated.

The following discussion provides a method to factor some of the numbered issue and concern questions into more specific planning questions. Selected public comments, management concerns, and background situations are also provided.

1. To what degree should the Dixie NF place a greater emphasis on fire management?

Planning Questions

a. How much less than all out wildfire suppression should we provide?

b. To what extent should prescribed fire be used as a resource management tool?

Public Comments

- Let some wildfires burn.
- All-out fire suppression is too costly.
- Controlled burning may save money.
- Benefits have resulted from wildfires.
- Reseeding should accompany a burning program.
- Other methods than fire should be used to remove vegetation.
- Wildfires can easily get out of control.
- Fires should not be started, but not all wildfires should be suppressed.

Management Concerns

- Fire suppression should be cost effective relative to resource values. A fire management plan is needed in conjunction with a prescribed burning program.
- A prescribed burning program will benefit range, wildlife, and reduce fuel accumulations.

Background Situation

Prompt and aggressive fire suppression is costly and has caused problems with fire dependent ecosystems. Historically, fire rejuvenated wildlife browse, retarded the spread of unwanted vegetation into grazing lands, and reduced the amount of ground fuels. But after several decades of fire control these and other beneficial effects of fire are disappearing. A solution could be to allow - under certain specified conditions and places - wildfires to burn until they extinguish themselves or suppress them after they meet prescribed objectives.

Under a prescribed burning program, fires would be started and controlled under specified conditions to remove unwanted vegetation or fuels and provide other resource benefits.

2. How much of an increased demand on Forest resources should be anticipated?

Planning Questions

a. Should we plan for a large and rapid increase in local populations due to energy development and MX?

b. Should we plan for normal population growth (without MX and energy development)?

Public Comments

- Plans should be made now for a population increase based on rapid growth.
- Be prepared for the population increase.
- Plan to protect existing uses and resources.
- Plan for a growth pattern similar to other western states.
- Plan for protection of existing uses as much as developments.
- Because of anticipated growth, preserve as much of the Forest as possible for back country and wilderness.
- Plan for more camping areas and water uses.

Management Concerns

- What are the effects on the local communities and the related effects on NF resources from population increases due to MX, coal, and energy developments?
- When and in what quantities will the population increase?

Background Situation

Government agencies and others describing the potential impacts of the MX missile proposal and energy developments forecast an extremely large influx of non-resident workers and their families into local communities.

This influx of people will impact not only the community, but also the NF. Increased demands for water, firewood, and recreation opportunities are some of the expected impacts.

If the MX proposal and the energy developments fail to materialize in the near future, the Dixie NF can anticipate increased use but at lower levels.

3. To what degree should the Dixie NF consider economic and social stability of communities dependent on Dixie NF resources?

Public Comments

- Provide for the people whose livelihood depends on Dixie NF resources.
- Preserve the traditional lifestyles and occupations of local residents.
- Provide timber to maintain local sawmills.
- Provide timber that will allow small sawmills to compete with the large sawmills.
- Grazing and mining on the NF help maintain the economy of local communities.

Management Concerns

- Accelerated or fluctuating timber harvests could create impacts on communities with sawmills.
- Supplying resources in small quantities may be less efficient than supplying resources in larger quantities.
- Established policies favor open competitive bidding for NF resources, which may be a disadvantage to the small local resource user.
- The extent of mineral and energy development on the Forest will significantly affect surrounding communities.

Background Situation

The benefits of the Dixie NF have traditionally been available to all users - national, regional, and local. The demand by these classes of users has, until recent times, been reasonably balanced. Little conflict between users has occurred. Now, however, the demand for more wilderness, clean air, scenic beauty, and other non-development benefits by national and regional users has created a concern to local users. The social and economic well being of local users and their communities is, in varying degrees, dependent on timber harvesting, grazing, recreation, and other development activities on the NF. Hunting and fishing play an integral part in the lifestyle of southern Utah and contribute significantly to the economy of the local communities involved.

In addition, the users in some local communities are concerned that sales of NF resources will be awarded to bidders from other communities in a disproportionate manner.

4. To what extent should the Dixie NF accelerate the harvest of overmature timber to reduce mortality losses?

Planning Questions

a. Should we maintain the present level of timber harvest but shift emphasis to overmature areas?

b. Should we accelerate timber harvest?

c. Should we base timber harvest on the capability of the most productive sites (50 cubic feet per acre per year growth)?

Public Comments

- Harvest the timber before it is lost.
- Harvest to keep stands healthy and silviculturally sound.
- Harvest based on sound ecology.
- Harvest based on production of 50 cubic feet per acre per year.
- Do not harvest, save for such uses as wildlife, scenery, recreation, and research.
- Continue to harvest at present levels.
- Do not harvest in marginal areas.

Management Concerns

- Should we proceed with an accelerated timber sale program to reduce losses from insects and disease?
- Timber harvest in scenic areas, lands near National Parks, high use recreation areas, and other special areas may need specific treatment.
- There is a need for the Forest to provide a balance in the size of timber sale offerings.

Background Situation

Large blocks of over mature sawtimber exist that are susceptible to killing attacks by insects and diseases. To continue at present rates of harvest will expose many million board feet of high value timber to increased risk of mortality. The loss could reduce the available timber to sustain sawmills and their support of local communities. An accelerated harvest would require an increase in road construction to provide access to the timber.

However, another consideration is that an accelerated harvest of timber now could result in less timber available for future harvests. That would be true until younger age classes reach merchantable size.

5. To what extent should the Dixie NF emphasize wildlife management?

Planning Questions

a. What is the Forest capability to provide wildlife and fish habitat and how much of this capability should be utilized for wildlife and how much for other resources?

b. To what extent will protection of aquatic and riparian ecosystems enhance important wildlife habitat?

Public Comments

- Wildlife is one of the important uses of the Dixie and should be protected.
- Wildlife is running short of sanctuaries.
- Threatened and endangered wildlife species have not been adequately provided for in the past.
- Big game habitat is compatible with other uses and should be managed.
- Both game and non-game species should be considered.
- Limit the use of critical habitat when the animals use them.
- Control developments such as roads, summer homes, and mineral leases.
- Habitat should be improved but not to the restriction of other uses.
- Wildlife should be considered under the multiple-use concept and should balance out with other Forest uses.
- Control off-road vehicles.
- Non-beneficial endangered species should not restrict other Forest uses.

Management Concerns

- Seismic exploration may be disturbing to wildlife.
- Evaluate wild turkey habitat.
- Maintain existing habitat and expand the range of Utah Cutthroat trout.
- There is a concern for sediment production and its effect on the aquatic ecosystem.
- There is a need for conservation pools and stabilization of all reservoirs on the Forest.
- We need to determine the significance of aquatic and riparian ecosystems on the Forest for wildlife.

Background Situation

The Forest is used for various activities such as livestock grazing, timber harvesting, and recreation. These activities may, at times, result in conflicts with key wildlife habitat.

Key habitats are those areas with unique features essential to the animals' well-being. They are seldom abundant and often accommodate other uses besides wildlife.

Consumptive (hunting and fishing) and non-consumptive (picture taking) use of wildlife continues to be a major recreational activity, with increasing demand anticipated. Opportunities exist on the Forest to provide a greater variety and amount of wildlife species by implementing an active habitat improvement program.

Methods of habitat improvement include chaining, water development, prescribed burning, seeding, and stream improvement.

6. How should the Dixie NF manage its firewood resource?

Planning Questions

a. To what extent should the Dixie NF increase fuelwood availability?

b. To what degree should the removal of fuelwood be restricted in some areas to provide for wildlife species dependent on deadwood for habitat.

Public Comments

- Determine the needs of wildlife before restricting fuelwood removal.
- Wildlife value is superior to fuelwood values on key habitat.
- Pinpoint specific areas needed for snags and deadwood and take measures to protect them.
- Balance fuelwood and wildlife needs with other resource programs.
- Inform and educate the public on the benefit of wildlife trees.
- Physical closure of some areas may be needed to save standing trees.
- Consider both game and non-game species in fuelwood management.
- Firewood removal will make little difference to wildlife.
- There is ample deadwood for both wildlife and fuelwood removal.
- Restrict use of standing deadwood but not on down material.
- Deadwood is a fire hazard.

Management Concerns

- The supply of fuelwood and its demand is not uniform throughout the Forest.
- Should we inventory and determine the availability of firewood versus the demand for firewood and also be responsive to the demand for certain species for firewood?
- Should greenwood be made available to meet fuelwood demand?
- Should personal use firewood be charged for?

Background Situation

The high public demand for fuelwood in accessible areas and a lack of public understanding of the need for deadwood, primarily standing dead trees, is resulting in a conflict between wildlife needs and fuelwood removal in some areas of the Forest.

Many wildlife species are dependent upon dead trees to provide nesting, feeding, perching, and roosting habitat. These snag-dependent wildlife species are an important part of the Forest ecosystem, by helping to keep populations of destructive insects at more manageable levels, by providing food for other species of wildlife, and by furnishing much in the way of non-consumptive enjoyment to the public. When the number of snags is reduced below certain levels, the populations of many wildlife species can be seriously reduced or eliminated.

Fuelwood is getting scarce in accessible areas close to population centers. The supply is considered ample in remote areas. Designating green pinyon pine, juniper, and aspen trees as fuelwood could increase the supply.

7. What level of livestock use should be planned for?

Planning Questions

a. How will the forage resource be utilized to meet food and cover needs of management indicator species of wildlife and other targeted species as well as livestock forage?

b. Do opportunities exist to significantly increase carrying capacity of the range?

Public Comments

- Grazing levels should continue, but grazing should be part of multiple-use and not endanger the land and other Forest uses.
- Grazing is an important economic source to local people.
- The control of wild horses should be considered.
- Overgrazing should be avoided.
- More range improvement programs should be planned.
- Consider fencing out livestock in areas where accelerated erosion is occurring and water quality is being impaired.
- Considering an increasing population trend, grazing should be decreased in favor of recreation.
- The Dixie NF should increase grazing.
- Phase out grazing in favor of other uses.

Management Concerns

- What investments should the Forest make to maintain grazing capacity and minimize conflicts with other uses?
- To what extent should herbicides be used for noxious weed control and vegetative manipulations.

Background Situation

Over the past 20 years livestock use has been balanced with range carrying capacity on most allotments. Most of these allotments are now in fair to good condition and under intensive management.

New uses and competition for the land may increase pressure to reduce livestock grazing on some areas. Conflicts may also arise between livestock grazing and recreational activities in riparian areas, key big game habitat, and other important wildlife areas that have high use.

8. How should the Dixie NF protect on-site values of streams, lakes, springs, riparian areas, and their associated fishery values?

Planning Questions

a. Should the Forest protect the ecological and aesthetic values of streams, springs, and riparian areas by restricting permits to divert water from Forest lands?

b. Should protection of aquatic and riparian ecosystems be undertaken to enhance important wildlife and fisheries habitat? (See No. 5.)

Public Comments

- Water yields to present owners of water rights should not be reduced by further water developments.
- Recreational needs should dictate water use.
- The Forest Service should provide more ponds and lakes.
- Gullies should be dammed to hold back spring runoff.
- The needs of water users should dictate water diversions.
- Strict monitoring should be exercised to prevent excessive diversion.
- Water belongs to the State.
- The Forest should restrict permits for water diversions to protect ecological and aesthetic values.
- Water diversions should be restricted only on a case-by-case basis.

Management Concerns

- Should the Forest allow water diversions that will dry up drainages in the National Forest?
- The Forest needs to recognize the values of instream flows as a basis for decisions in future water diversion proposals.
- The Forest needs to determine priorities for resource management in riparian areas.
- Should the Dixie continue its program of rehabilitating gullies with check dams and sloping gully banks in order to repair riparian and aquatic ecosystems?

Background Situation

Water is needed to irrigate crops and for domestic purposes on private land. As land developments increase, an increased demand for water originating on the Forest can be anticipated. This is a beneficial use of the water and of the National Forest. However, there are also many benefits if some of the water is available on the Forest. Those include wildlife and livestock watering, providing aesthetic values to Forest visitors, and maintaining a diversity of plant and animal communities.

The use of National Forest land as a location for water pipelines or canals must be authorized by permit. Thus, the Dixie NF has some control over diversion of water by manmade structures.

9. How should the Dixie NF coordinate exploration, leasing, and development of energy and mineral resources, including the location of energy transmission corridors, with other resource values?

Public Comments

- Permit exploration and development where environmental values can be adequately protected.
- Allow the search for minerals and energy without undue restrictions or regulations.
- The placement of utility corridors should be carefully controlled and in some cases not allowed.
- Provide for energy development but involve local communities in the decision making.
- Provide better control of seismic and other exploration activities to reduce impacts to wildlife.
- Oil and gas exploration permits or leasing should not be allowed on any of the proposed wilderness or further planning areas.
- Evaluate each proposal on a case-by-case basis.
- Utility corridors are not necessary unless they serve Utah communities.
- The Dixie NF should not coordinate with exploration and development of energy and mineral resources.

Management Concerns

- Where and when should utility corridors be established on the Forest?
- Where should mineral and energy development be allowed on proposed wildernesses and further planning areas?
- There are coordination problems between seismic activities and other resource uses.
- Where on the Forest should the Forest Supervisor recommend approval of oil and gas lease applications and with what types of restrictions?

Background Situation

Many desired energy-minerals are known or suspected to be located in southern Utah. The Dixie NF is surrounded and underlain by deposits of some of those energy minerals and has high potential for discovery and development of others. Four separate coal fields underlie four of the Dixie's five Ranger Districts. Three of these coal fields are being studied for their mining potential by industry.

Most of the Forest is within the Overthrust Belt, a potential oil discovery area. The Dixie has one producing oil field. Carbon dioxide gas has been discovered in another location. Prospecting and exploration for oil and gas is intensifying every year. Almost the entire Forest is under oil and gas lease.

Exploration and development activity will intensify in direct proportion to rising energy mineral prices and growing shortages. Requests for energy mineral related leases and permits to use National Forest land will increase accordingly.

As the energy crisis - minerals shortage progresses there will be more and more requests for rights-of-way across National Forest land for energy minerals related improvements. Presently, there are several conceptual plans which would take a railroad, coal slurry pipeline, or power transmission line through the Dixie National Forest.

10. How much emphasis should the Dixie NF place on coordinating or restricting Forest activities in order to maintain or enhance scenic values along major roads, other travel corridors, and areas of outstanding scenic quality?

Public Comments

- The Forest should modify its uses to enhance scenic values.
- Aesthetic values should be maintained on the whole Forest, not just on roads and travel ways.
- Scenic values should be protected.
- Construct roadside scenic overlooks.
- Scenic values should be protected only to the extent that significant resource uses would not be impaired.
- The present policies of protecting scenic values are satisfactory.
- Resource uses should not be modified merely to protect scenic values.

Management Concerns

- Identify and rate areas of scenic value.
- Determine the impacts on scenery resulting from resource use activities.

Background Situation

The Dixie NF is located near three National Parks and one National Monument. These areas attract people who are interested in outstanding scenic landscapes. These people are also viewing some of the Dixie NF, and their anticipation for the scenic landscape is often the same for the Forest as the Parks. The scenic environment seen from major travel routes may need to be preserved. Increased activity in timber harvesting, mineral and energy development, and other resource uses makes it more difficult to preserve the visual quality on the Forest.

11. What should the balance be between accommodating increased recreation use and other resource uses?

Planning Questions

a. Should motorized travel by wheeled vehicles be limited on seldom used roads and cross-country areas in order to reduce wildlife disturbance and minimize soil erosion and other resource damage?

b. Should emphasis be placed on providing additional developed recreational sites for camping, picnicking, and/or dispersed types of recreation such as trail hiking?

c. Should the Dixie NF encourage other government agencies and the private sector to develop recreation areas off the Forest and allow private concessions to provide facilities on Forest lands?

Public Comments

- Restrictions should be applied to ORV's on recommended wilderness and further planning areas and from other biologically sensitive areas.
- Motorized travel should be restricted to reduce disturbance to wildlife and soil erosion.
- Motorized travel should be limited only when absolutely necessary.
- Restrict ORV use only during periods of high potential damage to the natural resources.
- Closely monitor and police areas with restrictions.
- The Forest should be open for recreational use, and restrictions should not hamper an individual's access to the land.
- Do not restrict ORV use for individuals whose livelihood depends on access to roadless areas. Restrict ORV use by all others.
- Continue the present policy for travel by wheeled vehicles.
- Additional recreational facilities will have to be provided to meet the increasing demand.
- Developed sites should take priority over dispersed recreation.
- Most recreationists have motorized camping equipment and prefer developed sites.
- There is a need for additional developed recreational facilities.
- Dispersed recreation is harmful to the Forest and endangers wildlife.
- Existing recreation facilities should be expanded and new developments should be installed.
- Develop small scale camping and picnic areas.
- The popularity of dispersed recreation is increasing.
- There are enough developed sites on the Forest and adjacent lands.
- Give dispersed types of recreation highest priority.
- Emphasize natural Forest experiences.
- Dispersed recreation provides for better dispersal of users and accommodates more people.
- Dispersed recreation is less costly to manage and present funding is inadequate to manage developed areas.
- Recreation use should be considered equally with other uses.
- Recreation developments should be directly controlled by the Forest Service.
- Development should not be controlled by the private sector.
- Coordinate with the State of Utah and other Federal agencies when identifying recreation areas.
- People who use developed sites should pay most of the costs for construction, maintenance, and operation.
- All types of recreation should be provided for in a mixture conducive to demand and environment.

Management Concerns

- Should the Dixie NF emphasize trail management in order to provide additional dispersed recreational opportunities?
- Should the Forest provide developed facilities to meet the needs of users primarily going to and from the adjoining National Parks and Monuments?
- The Forest needs to reevaluate its recreation construction program and recognize the lack of recreation vehicle sewage disposal and inadequate surfacing of campground roads?

Background Situation

Overuse of campgrounds is currently a widespread occurrence throughout much of the Forest. Because of a continuing lack of recreation construction funds, the Forest has been unable to expand or, in some cases, even replace the existing facilities. This funding shortage has also left the Dixie unable to expand small campgrounds in order to create larger, more economically efficient facilities. While increasing energy and transportation costs might discourage some members of the user public, it may also increase demand for campgrounds from the local population and from users of more distant origins who desire a single destination area rather than continually traveling during their vacation. Local population increases will also certainly increase developed site use even further. With present overcrowding likely to continue, limits on the number of recreationists may need to be established. Consequently, means may need to be found to manage the overflow of visitors. These means might include rehabilitation of existing sites, new or expanded campgrounds (publicly or privately operated), and additional overflow areas.

Opportunities exist to provide for the increasing demand of dispersed recreation in the Forest. Dispersed recreation can be defined as outdoor recreation activities being done on developed areas such as hiking, horseback riding, auto touring, motorcycle riding, and camping and picnicking in a primitive setting. One of its main advantages is that it would spread the use over large areas and over a longer period. This type of recreation also has its problems. In the past, relatively little effort has been devoted to developing comprehensive trail systems for winter and summer use. Trailheads are generally underdeveloped, undersized, and poorly marked. The lack of parking for snowmobilers and cross-country skiers creates traffic congestion when snow limits parking to designated plowed areas.

Certain types of dispersed recreation activities are not highly compatible. At this time, the biggest conflict occurs between cross-country skiers and snowmobilers, who tend to concentrate in the same areas.

Besides conflicts between users, dispersed recreation creates conflicts between users and resources. Motor vehicle use on roads built for periodic resource harvest can disturb wildlife and increase soil erosion by rutting.

Off-road vehicle use is now restricted in some areas of the Forest, primarily to reduce soil erosion and protect wildlife and other resources. In general the ORV restrictions are working well, but periodic review is needed.

12. Should the Dixie NF emphasize developed group sites over single family units when considering new recreation site construction?

Public Comments

- Emphasize the construction of facilities for large groups of people.
- Group areas are less costly to build because they are larger.
- The present group facilities are inadequate to support the present demand.
- Group areas near population centers should be given highest priority.
- Develop one group area for each camping or picnicking area.
- Group camping areas should not conflict with family units.

- Group areas intensify pollution and problems.
- Small family units provide for a more balanced use.
- There should be more family units and fewer group areas.
- Facilities for large group and single family units should be equally emphasized.
- Group sites are not cost effective.
- A combination of both family units and larger group areas should be implemented.

Management Concerns

- Existing facilities are inadequate to accommodate demands for group use.

Background Situation

Camping and picnicking areas are commonly designed to accommodate family groups needing one table, one grill, one parking spur, and occupied on a first-come, first-serve basis. Large groups of people, such as family reunions and other social gatherings, need different facilities. Groups also need to be able to reserve the facilities to ensure space for all members.

On the Dixie NF there seems to be a strong demand for facilities to serve reunions, church groups, youth groups, etc. Resource damage has occurred because of the lack of adequate facilities for these user groups. Because of these demands and resource damage, this issue needs to be resolved.

13. What should be done to separate the recreational activities of conflicting user groups such as cross-country skiers and snowmobilers?

Public Comments

- Recreational opportunities should be provided for trail bike use.
- Both snowmobilers and cross-country skiers should have their own area, including parking.
- Provide trails for day hikers and backpackers.
- Group camping areas should not conflict with family unit camping.
- All types of recreation should be provided for in a mixture conducive to demand and environment.
- Provide walking, hiking, snowmobile and cross-country trails.
- Designate certain areas for use by certain groups.
- Provide separate facilities for non-compatible users.
- Better vehicle parking would greatly assist recreation dispersal.

Background Situation

(See Background Situation No. 11.)

14. How much emphasis should we put on a transportation system that is safe and convenient for public use?

Planning Questions

a. How can we best provide for public transportation needs consistent with resource management needs and resource protection.

b. Should the Dixie NF coordinate with local government and private landowners on the jurisdiction, maintenance, and funding of roads and rights-of-way crossing private land?

c. How much more emphasis, money, and manpower should be placed into developing and maintaining a comprehensive trail system.

Public Comments

- Presently, there is little or no effort put into the individual trails and backcountry areas for recreation.
- Trails are being destroyed by timber sales, chainings, etc.
- You should develop more trails and maintain them better, especially with signs.
- The Dixie NF should put more emphasis, money, and manpower into developing and maintaining a connecting trail system.
- Parking areas near points of interest in recreation areas, particularly at trailheads for backpackers, skiers, and snowmobilers, need to be constructed, maintained, and cleared of snow.
- The safety, capacity, and convenience of existing transportation facilities need to be improved.
- The Forest is not providing the public with an adequate, safe, and convenient transportation system.
- Open roads that have been closed (roads not needed for resource management) should be closed until they are needed again.
- The economics of road construction and maintenance must be considered.
- Low standard roads attract fewer travelers and are therefore desirable.
- There are presently a sufficient number of roads on the Forest to provide access.

Management Concerns

- There is a need for the management of low standard roads to alleviate erosion, wildlife disturbance, visual effects, trespass, and other management problems.
- There is a need for coordination with the counties on the maintenance of roads and rights-of-way responsibility.
- There is a need to improve and increase the amount of transportation system planning.
- There is a need to upgrade trail markings, trail maintenance, and trail maps.

Background Situation

Under current conditions, responsibility for the transportation system that provides access to the Dixie NF is shared between USDA Forest Service, other Federal agencies, State agencies, Local governments, and others. Each agency has its own goals, needs, standards, capabilities, and funding limitations. This diversification of responsibilities leads to inefficiencies in providing and maintaining a public transportation system.

The safety, capacity, and convenience of the existing system needs to be improved in many areas. In other areas where existing roads contribute to wildlife disturbance, soil erosion, and other resource damage, obliteration or closures may be needed.

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APPENDIX B
DESCRIPTION OF THE ANALYSIS PROCESS

I. DISCUSSION OF PROCESS

A. Generalized Planning Process

The National Forest Management Act of 1976 (NFMA) charges the U.S.D.A. Forest Service with the responsibility of forming one integrated land and resource management plan for each unit of the National Forest System. This plan is to determine how best to meet public needs and desires within the capability of the land to produce goods and services.

Public views differ concerning the relative importance of producing commodities such as timber or livestock forage, and providing amenities such as dispersed recreation opportunities or wildlife habitat. The major planning goal is to provide the information needed by decision makers to determine the mix of goods and services that will maximize net public benefits. Net public benefits are defined as the overall long-term value to the Nation of all outputs and positive effects (benefits), less all associated inputs and negative effects (costs), whether they can be quantitatively valued or not. Net public benefits include priced outputs such as timber board feet and animal unit months, and nonpriced items such as visual quality, wildlife habitat diversity, water quality, and variety of recreation opportunities.

The National Forest Management Act (NFMA) and the regulations developed under NFMA (36 CFR 219) provide the analytical framework for developing a Forest Plan. The planning problem is a very complex one. Analytical techniques to reduce the complexity and magnitude of the problem were available to the interdisciplinary planning team. They are described in the appendix.

The Planning Process

This analytical framework includes the 10 step planning process as outlined in NFMA regulations. The 10 step planning process created new outlook and a new technology for National Forest land management. Processes formerly used to make individual resource decisions are now combined to help make integrated management decisions, and new mathematical modeling techniques are used to assist in land allocation decisions, including identifying the most cost-efficient pattern of land management. These steps are listed below:

1. Identification of Purpose and Need
2. Development of Planning Criteria
3. Inventory Data and Information Collection
4. Analysis of the Management Situation
5. Formulation of Alternatives
6. Estimated Effects of Alternatives
7. Evaluation of Alternatives
8. Preferred Alternative Recommendation
9. Plan Approval
10. Monitoring and Evaluation

Steps 1, 2, 7, and 8 are judgemental steps and are described in Chapter I, II, IV and in Appendix A of the DEIS. Steps 9 and 10 are execution steps and are described in the proposed Forest Plan. Steps 3, 4, 5, and 6 are analytical steps and are briefly explained below.

1. Identification of Purpose and Need. Through public participation, including contacts with other Federal agencies, Indian tribes, State and local governments, the Forest interdisciplinary team identified public issues, management concerns, and resource opportunities (ICOs). The Forest Supervisor than identified the major ICOs to be addressed in the planning process.

2. Development of Planning Criteria. The Forest Management Team developed criteria based on the identified ICOs to direct the collection and use of inventory data, the analysis of the management situation, and the design, formulation, and evaluation of alternatives.

3. Inventory Data and Information Collection. The Interdisciplinary Team determined what inventory data was needed. Most data requirements concerned resource capabilities, demands, or benefits and costs. Existing data was mainly used with some supplemental information developed to fill information gaps.

4. Analysis of the Management Situation. The analysis of the management situation process determined the Forest's capability to provide the goods and services (supply) to meet public needs and desires (demand). A FORPLAN linear programming model and other analyses determined the maximum present net worth (PNW) the Forest can generate; projected the current management program; evaluated the feasibility of meeting RPA production goals; displayed the minimum costs necessary to retain the lands in the National Forest system; provided a basis for formulating a broad range of reasonable alternatives; and defined the feasible parameters (benchmarks) for production of timber, water, and livestock forage. This information was compiled in a document titled the Analysis of the Management Situation (AMS) which may be reviewed at the Forest Supervisor's Office.

5. Formulation of Alternatives. The alternatives were formulated according to AMS benchmarks, ICOs, and specific direction which required:

a) formulating a range of feasible resource outputs and expenditure levels;
b) an analysis of opportunity costs, environmental tradeoffs, and effects on present net value, benefits and costs;
c) different ways to address the major ICOs';
d) alternatives that included RPA resource values;
e) each alternative to include the most cost efficient management prescriptions examined to meet alternative objectives;
f) an alternative to display, over time, costs and benefits that do not change (No Action Alternative);
g) an alternative to display of the costs, benefits, and goods and services that could be provided at 75 percent of current budget;
h) alternatives to emphasize commodity production and amenity (non-market) production.

6. Estimation of Effects of Alternatives. The physical, biological, social and economic effects of implementing each alternative were estimated and analyzed. The process showed how each alternative meets its goals and objectives, responds to ICOs and compares to the other alternatives. The output levels, benefits, and costs for timber management were analyzed by the Version II FORPLAN model. Other output levels, benefits, and costs were analyzed outside of FORPLAN and are discussed in this Appendix.

The analysis include direct effects, indirect effects, cumulative effects, conflict with other existing governmental agencies or Indian tribal land use plans, historical and cultural resources, energy and transportation corridor effects, mitigation measures to meet legal standards, and other environmental effects.

7. Evaluation of Alternatives. Using a trade off evaluation process (TEP), the Forest Management Team analyzed the significant physical, biological, economic, and social effects of each of the alternatives considered in detail. The analysis included present net value, social and economic effects, outputs of goods and services, and overall condition of environmental resources.

8. Preferred Alternative Recommendation. Using the analysis described in step 7, the Forest Supervisor recommended a preferred alternative to the Regional Forester. The preferred alternative is identified in Chapter II of this draft Environmental Impact Statement (DEIS), and is displayed as the proposed plan in the accompanying Forest Plan.

9. Plan Approval. After the issuance of the Final Environmental Impact Statement/Forest Plan (FEIS/Plan), the Regional Forester will review the FEIS/Plan and will either approve or disapprove it in accordance with 36 CFR 219.10(c). If the Plan is approved, a Record of Decision (ROD) will be issued according to NEPA requirements, (40 CFR 1505.2).

10. Monitoring and Implementation. A Monitoring Plan is included in Chapter V of the Forest Plan. It includes the actions, effects, or resources to be monitored; the frequency of measurement; the expected precision and reliability of the monitoring process; the monitoring schedule; and the allowed variation limits. Implementation will be evaluated at intervals established by the Monitoring Plan to determine how well Plan objectives are being met and how closely management standards and guidelines are being followed. Based on this evaluation, the interdisciplinary team may recommend to the Forest Supervisor changes in management direction, and revisions and amendments to the Forest Plan.

B. Development of Benchmarks and Alternatives

The planning process is built around the alternatives which eventually leads to the proposed course of action (the Plan). Alternatives provide different methods of managing the Forest while meeting stated goals and objectives. A wide range of alternatives is necessary to provide an adequate array of choices. Yet, the range or array, must not exceed the Forest's ability to provide goods and services. In order to evaluate the parameters of what the Forest is capable of producing, benchmarks were established. Benchmarks provide the maximum and minimum limits of a resource under cost efficiency management conditions that could be produced. Benchmarks are not intended to be implemented as a possible course of action.

C. Comparison of Alternatives

Information regarding the effects, the costs and the benefits of each alternative are displayed in narratives, tables and charts, so that readers can observe the outcome of implementing any of the alternatives. The information provided is of equal depth and intensity for each alternative.

II. DOCUMENTATION OF ANALYTICAL TOOLS

A. FORPLAN Resource Allocation Model

1. Overview

FORPLAN (short for Forest Planning model) was the Linear Programming (LP)model used in the development and evaluation of benchmarks and alternatives. FORPLAN (Version II) is a third-generation configuration of a series of LP models developed by the Forest Service to aid in resource management planning. Timber RAM and MUSYC, two predecessors, are single resource models designed to evaluate timber allocation problems. FORPLAN, on the other hand, is designed to evaluate problems involving "multi-resource" outputs.

In general, linear programming is a mathematical optimization technique which seeks to assign values to decision variables in such a way as to simultaneously satisfy a set of linear constraints and maximize or minimize a linear objective function. Linear programming has been applied to a diverse set of problems involving the allocation of scarce resources in an optimal manner. In the Forest Plan resource allocation model, management prescriptions (the decision variables) are allocated to areas of land (analysis areas) in a manner which maximizes present net value (the objective function) while satisfying certain conditions such as minimum or maximum levels of some Forest products (constraints). A brief description of the major components of the FORPLAN model follows.

2. Capability and Analysis Areas

Capability areas represent contiguous areas of land possessing the same or very similar characteristics such as site productivity, plant species or cover type, degree of access, or some combination thereof.

As formulated, analysis areas represent both contiguous or noncontiguous areas of land. Noncontiguous analysis areas are generally representative of scattered areas of land possessing similar characteristics such as site productivity, cover type, degree of access, or some combinations thereof. The principle reason for this type aggregation is to group capability areas with similar response functions in biological and/or financial terms on a slightly broader scale than capability areas.

Contiguous analysis areas represent logical management units such as Wilderness areas, municipal watersheds or developed recreation areas. Allocation of these areas to a specific management emphasis as represented by management prescriptions is usually on an "all or nothing" basis, which means the analysis area must be allocated to one, and only one, type of management.

Dixie analysis areas were noncontiguous. To address logical management units (contiguous areas) in various alternatives, a level identifier (described below) highlighted the fact that a noncontiguous analysis area was part of an existing or potential management unit. When an alternative specified that noncontiguous analysis areas represented a management unit, the same prescription was applied to all analysis areas in the management unit.

In the model, analysis areas from the basic units on which management decisions are made. A hierarchy of analysis area identifiers categorize these land units and provide a structure for formulating or describing resource allocation problems through the use of constraints and objective functions. The design of such a hierarchy is critical to the correct specification of production possibilities on the Forest.

The Land Systems Inventory and Timber and Range Inventories were used as the major basis for determining biological capability and lands suitable for management activities.

Biological Capability

Forested areas were separated on the basis of timber type (spruce-fir, mixed conifer, ponderosa pine, and aspen). These areas were further separated on the basis of availability and suitability. Accessibility, slope, and hazard areas were used as criteria. Within productive Forest land, capability areas tentatively suitable and available, for harvest, separations were made on condition (clearcut, partial cut, stocked, nonstocked, mistletoe and disease infected, etc.). Difference in productivity was also used in the separation process.

The remainder of the Forest was separated on the basis of vegetative type, suitability, productivity, type of hazard, etc. Vegetative types separated included pinyon-juniper, mountain brush, sagebrush, grass-forb, oakbrush, and miscellaneous land areas such as pink cliffs, rockland, and basalt flows.

Special consideration was given to hazard areas, such as erosive soils, unstable landforms, areas of low productivity, riparian areas,big game winter range, etc., in the separation of capability areas.

The Forest Management Team identified special areas of concern, such as proposed wilderness areas, roadless areas, municipal watersheds, and recreation areas where special management prescriptions would be needed.

Lands Tentatively Suitable for Management Activities. Lands tentatively suitable for management activities were determined by the appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

Recreation and Water. All areas of the Forest were considered suitable for water production and for some types of recreation activities.

Minerals. The entire Forest is considered available and suitable for mineral and energy exploration and development; except for 9,014 acres withdrawn, 83,000 acres of Wilderness, and about 20,000 acres which have reserved mineral rights. Protective stipulations, including no surface occupancy, were considered in determining the lands suitable for mineral purposes.

Range. Determination of land available and tentatively suitable for range production follows instructions in U.S.D.A. Forest Service, Intermountain Region, Range Analysis Handbook (FSH 2209.21).

Suitable range produces forage or has inherent forage producing capabilities, can be grazed on a sustained yield basis under reasonable management goals, and is accessible or made accessible to livestock (FSH 2209.21). For a more detailed explanation of range suitability see the Analysis of the Management Situation document, and/or the planning records located in the Forest Supervisor's Office.

Timber. National Forest System lands are divided into three major categories, productive forest land, nonproductive forest land, and non-forest land.

Productive forest land is capable of growing industrial crops of wood. This classification includes accessible and inaccessible, and stocked and non-stocked land.

Nonproductive forest land is not capable of growing industrial crops of wood. Nonproductive forest land is classified as land not suited for timber production.

Non-Forest land was identified as land that has never supported forests and lands formerly forested where use for timber production is precluded by development for other use. (Note: Includes areas used for administrative sites, improved roads of any width and adjoining clearings, powerline clearings of any width, barren, grass, etc. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and clearings, meadows, etc., must be more than one acre in size to qualify as nonforest land). Nonforest land is classified as land not suited for timber production.

Productive forest land which has been legislatively or administratively withdrawn from timber production by the Secretary or the Chief of the Forest Service is not available. Productive not available forest land is classed as not suited for timber production.

Lands available for timber production are evaluated for suitability utilizing a three-stage test (FSM 2415):

Stage I - Physical Suitability
Stage II - Economic Suitability
Stage III - Suitability according to the Goals and Objectives

Stage I - Physical Suitability

The first test determined if technology was available that would ensure timber production, including harvesting, from the land without irreversible resource damage to soil productivity or watershed condition. Areas so strewn with boulders that logging is impractical were classed as unsuitable. Another test for physical suitability is whether there is reasonable assurance that harvested lands can be adequately restocked within five years.

For a more detailed explanation of Stage I, see the Analysis of the Management Situation document (AMS).

Stage II - Economic Efficiency

The purpose of the Stage II analysis is to organize capable, available, and tentatively suitable timber producing lands into analysis areas that significantly affect timber management costs and values at various levels of management intensities (prescriptions). Available forest lands will only be considered economically suitable for timber production if they are included in the set of lands that are efficient in meeting the timber production goals for the Forest Plan.

The analysis results are documented in the AMS. All of the available productive timber land that entered this stage of the process from Stage I is passed to Stage II once the economic analysis is complete.

Stage III - Final Suitability Test

The choice of the timber production goals for the Forest Plan depends upon the goals and objectives of the alternatives. An alternative which places a higher emphasis upon timber production would generally allocate a larger land base to timber production. The exception is when it is more efficient to increase the timber cut on the existing land base, rather than expanding the base.

Capability and analysis areas were delineated on 7.5' orthophoto quads. A two to three digit numerical symbol (in black ink) was used to identify the analysis areas. Analysis areas on a single orthophoto quad contain their respective capability areas, using a dash (-) followed by a numerical symbol (in red ink). For example, on an orthophoto quad with eight delineations of Analysis Area 3, the eight individual capability areas of AA-3 would be identified as 3-1, 3-2, 3-3 - - - - - - - - 3-8.

Acreage was computed using a combination of dot counting and digitizing to determine the acreage of each analysis area. The acreage was computed by orthophoto quad sheets and summarized by quad sheets, by Ranger District, and finally for the Forest, as a whole. Acreage was also computed by Great Basin and Colorado River Basin watershed.

The stratification process resulted in 104 forested and non forested analysis areas.

After the initial stratification was completed it was decided that additional economic information needed to be incorporated in the stratification. The old forested analysis area number was kept as the Forplan Level 2 identifier and Level 3 (Logging Method), Level 4 (Regeneration Cost Categories), and Level 5 (% of Local Roads in place) were added. A description of original analysis areas are discussed following the presentation of Forplan identifiers. Only analysis areas with available and tentatively suitable forest land were included in the FORPLAN model. After the restratification process was complete 105 forested analysis areas were incorporated in FORPLAN.

FORPLAN LEVEL IDENTIFIERS

*LEVEL1 Not Used

*LEVEL2		OLD	AA
01	AA1	AA1	
03	AA3	AA3	
05	AA5	AA5	
06	AA6	AA6	
08	AA8	AA8	
13	AA13	AA13	
17	AA17	AA17	
19	AA19	AA19	
23	AA23	AA23	
24	AA24	AA24	
25	AA25	AA25	
29	AA29	AA29	
31	AA31	AA31	
35	AA35	AA35	
36	AA36	AA36	
39	AA39	AA39	
41	AA41	AA41	
51	AA51	AA51	
54	AA54	AA54	
55	AA55	AA55	
57	AA57	AA57	
60	AA60	AA60	
63	AA63	AA63	
70	AA70	AA70	
71	AA71	AA71	
72	AA72	AA72	
73	AA73	AA73	
74	AA74	AA74	
75	AA75	AA75	
76	AA76	AA76	
77	AA77	AA77	
78	AA78	AA78	
79	AA79	AA79	
2A	AA203	AA203	
2B	AA257	AA257	
3A	AA317	AA317	
3B	AA331	AA331	
6A	AA601	AA601	
6B	AA603	AA603	
7A	AA703	AA703	
7B	AA705	AA705	
7C	AA706	AA706	
7D	AA717	AA717	
7E	AA719	AA719	
7F	AA724	AA724	
8A	AA803	AA803	
8B	AA839	AA839	
9A	AA903	AA903	

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*LEVEL3        LOG   METH
  TT    TRACTOR TRACTOR LOGGING
  CC    CABLE CABLE LOGGING
  AA    AERIAL AERIAL LOGGING

*LEVEL4        REGEN COST
  RN    REGNORNORMAL REGENERATION
  RD    REGDIFDIFFICULT TO REGENERATE

*LEVEL5
  25    00T025-25% LOCAL ROADS
  50    26T050-50% LOCAL ROADS
  75    51T07551-75% LOCAL ROADS
  01    76T00176-100% LOCAL ROADS

*LEVEL6        NOT USED

*LEVEL7        MGT EMPH (DISCUSSED ON PAGE BII-50)

*LEVEL8        MGTINTENSITY (DISCUSSED ON PAGE BII-52, 53)
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ORIGINAL ANALYSIS AREA DESCRIPTIONS (FORPLAN LEVEL 2 FOR TIMBERED ANALYSIS AREA)

AA-1. *Forested plateau lands (mixed conifer). Slopes are generally less than 40 percent, however, some steeper slopes occur scattered throughout the analysis area. Under current management, this AA is being intensively managed for timber production. It is the most productive AA in the mixed conifer type.

Species composition as of the 1980 timber inventory:

Species	Percent
Aspen	40.6
Alpine fir	19.0
Engelmann spruce	13.4
White fir	11.0
Douglas-fir	11.0
Ponderosa pine	5.0

The average elevation is 9,400 feet. The dominant slope range is 20 to 30 percent. Site index for Douglas-fir is 40 feet in 50 years. Average tree age is 80 years. The analysis area averages 289 trees per acre, 87 of which are greater than 8 inches in diameter. The average net merchantable volume per acre is 5,820 board feet, or 1,145 cubic feet. Approximately 22 percent of this volume is aspen.

This analysis area contains 34,381 acres:

Cedar City Ranger District - 34,123 acres
Escalante Ranger District - 708 acres

Of the total AA acreage, 28,695 are available and tentatively suitable for timber production.

3,529 acres are non-forest and occur as small meadow openings or areas of rock outcrop. (Most of these areas are identified as 60 on the timber inventory maps.)

*"Original" analysis area number corresponds to FORPLAN level 2 identifier. 2,607 acres are non-commercial forest land which are sparsely forested areas generally on south and west aspects. These areas produce less than 20 cubic feet/acre/year. Soils are typically shallow and highly erosive. (Most of these areas are identified as 40 on the timber inventory maps.)

624 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These areas occur mostly on south and west aspects and on ridge tops. Problems include shallow, droughty soil and competing woody brush.

A total of 6,736 acres was identified as pure stands of aspen, 5,388 acres on slopes less than 40 percent and 1,348 on slopes greater than 40 percent. These areas were combined with analysis area 29 in the FORPLAN model.

17,139 acres of mixed conifer occur on slopes less than 40 percent. On slopes over 40 percent 129 acres are suitable for short span cable logging and 4,691 acres require long span cable or aerial logging methods.

AA-2. Dry meadows and broad open grass-sage areas. These forage producing areas are primarily associated with the ponderosa pine and mixed conifer vegetative types. They occur as elongated valleys (Swains, Strawberry Creek, etc.) interspersed throughout the forested plateau lands. Currently they are managed intensively for livestock forage production. This analysis area contains 14,019 acres. 46 of these acres consist of small lakes and ponds. This analysis area is distributed on four Ranger Districts:

Pine Valley Ranger District	- 3,179 acres
Cedar City Ranger District	- 4,074 acres
Powell Ranger District	- 6,443 acres
Teasdale Ranger District	- 323 acres

AA-3. Forested plateau lands (ponderosa pine). Slopes are generally less than 40 percent; however, some steeper slopes are included. This AA is the major timber producing AA in the pine type. Under current management it is intensively managed for timber production.

Species composition as of the 1980 timber inventory:

Species	Percent
Ponderosa pine	72.5
Aspen	11.8
Douglas-fir	7.0
White fir	5.4
Engelmann spruce	2.6
Limber pine, alpine fir	.7

The average elevation is 8,200 feet. The dominant slope range is 10 to 20 percent. Site index (Meyer) from the timber inventory is 30 feet in 50 years for ponderosa pine. A 1983 local site curve study for the Dixie National Forest (unpublished) indicates site index 37 feet for ponderosa pine in this analysis area. Average tree age is 55 due to the history of relatively intensive timber harvesting in this analysis area. The analysis area averages 285 trees per acre, 57 of which are greater than 8 inches in diameter. The average net merchantable volume per acre is 3,641 board feet, or 885 cubic feet. Only 4 percent of this volume is aspen.

This analysis area contains 117,697 acres:

Cedar City Ranger District - 31,834 acres
Powell Ranger District - 22,119 acres
Escalante Ranger District - 51,287 acres
Teasdale Ranger District - 12,907 acres

Of the total AA acreage 95,155 are available and tentatively suitable for timber production.

192 acres are water (small lakes).

15,146 acres are non-forest lands and occur as small meadows, sagebrush openings, areas of rock outcrop, and barren slopes. Many of the non-forest acres occur on the steeper slopes with south and west aspects. (Most of these areas are identified as 60 on the timber inventory maps.)

7,654 acres are non-commercial forest land which are sparsely forested areas generally on south and west aspects. These areas produce less than 20 cubic feet/acre/year. Soils are typically shallow and droughty. (Most of these areas are identified as 40 on the timber inventory maps.)

2,984 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These areas occur mostly on south and west aspects and on ridgetops. Problems include shallow, droughty soil and competing woody brush and perennial grasses.

A total of 1,538 acres was identified as pure stands of aspen, all on slopes of less than 40 percent. These areas were combined with analysis area 29 in the FORPLAN model.

87,227 acres of conifer occur on slopes less than 40 percent. On slopes over 40 percent, 1,879 acres are suitable for short span cable logging and 4,100 acres require long span cable or aerial logging methods.

AA-4. Steep dissected plateau sideslopes occurring typically below the limestone rimlands bordering the Markagunt and Paunsaugunt Plateaus. This AA generally occurs just below the commercial timber zone. Vegetation is dominantly mountain brush (principally serviceberry, oak, etc.) with small areas of aspen, and mixed conifer included which occur on north aspects.

Currently, these lands are not intensively managed. Much of this AA occurs on the Wasatch-Kaiparowits contact zone which has a high potential for slumping. Slumping of roadcuts is occurring on some roads. Opportunities exist for wildlife habitat and range improvement projects.

This analysis area contains 19,240 acres:

Cedar City Ranger District - 3,003 acres
Powell Ranger District - 16,237 acres

5,225 acres are non-forest and 14,015 acres are non-commercial forest land.

AA-5. Steep dissected sideslopes with mixed conifer and ponderosa pine types on north aspects and mountain brush on south aspects. Due to the extremely complex nature of these dissected landscapes, one AA was established rather than having many very small units of forested north aspects and brushy south aspects. Slopes are typically greater than 40 percent; however, there are some bench areas included. Much of the forested portion of the AA have been harvested in the past. Opportunities exist for timber management activities on portions of the forested areas and wildlife habitat improvements (burning, etc.) on the non-forested portions.

Species composition as of the 1980 timber inventory:

Species	Percent
Ponderosa pine	73.0
White fir	13.0
Douglas-fir	10.5
Limber pine	3.5

The average elevation is 7,600 feet. The dominant slope range is 30 to 40 percent on the timbered portion. Site index (Meyer) for ponderosa pine is 23 feet in 50 years. Dixie NF local site curves indicate site index 27 feet for ponderosa pine in this analysis area. Average tree age is 70 years. The forested portion of the analysis area averages 225 trees per acre, 38 of which are greater than 8 inches in diameter. The average net merchantable volume per acre is 2,997 board feet, or 711 cubic feet.

The analysis area contains 30,970 acres, all occurring on Cedar City Ranger District. 11,394 acres are available and tentatively suitable for timber production.

12,383 acres are non-forest and occur as brushy or barren south and west aspects and occasionally as pink cliff exposures of the Wasatch formation. (Most of these areas are identified as 60 on the timber inventory maps.)

3,993 acres are non-commercial forest land and occur on the sparsely forested south and west aspects and ridges where soils are shallow. These areas produce less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

3,338 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These areas occur on south and west aspects, ridgetops, and in the ponderosa pine/pinyon-juniper ecotone where available soil moisture is very low. These "fringe" type areas are typified by a moderate to dense understory of manzanita.

A total of 110 acres was identified as pure stands of aspen, all on slopes less than 40 percent.

6,207 acres of conifer occupy slopes less than 40 percent. On slopes over 40 percent, 809 acres are suitable for short span cable logging and 7,468 acres require long span cable or aerial logging methods.

3,200 acres are classified as unsuitable for timber harvest because of irreversible resource damage. These areas occur on south and west aspects and ridgetops and are characterized shallow droughty soils. Soil loss tolerance levels would be exceeded if site disturbance occurred.

AA-6. Broad rolling ridges with steep sideslopes and small benchlands included. This AA occurs in the transition zone from ponderosa pine to mountain brush, sage, and pinyon-juniper, primarily in the vicinity of Hatch mountain and Haycock Mountain on D-2. Productivity if low. Much of the forested portions of this AA have been harvested in the past.

Species composition as of the 1980 timber inventory:

Species	Percent
Ponderosa pine	87.0
Aspen	11.5
Douglas-fir	1.5

The average elevation is 8,100 feet. The dominant slope range is 20 to 30 percent. Site index (Meyer) for ponderosa pine is 25 feet in 50 years. Dixie NF local site index is 30 feet. Average tree age is 80 years. The analysis area averages 157 trees per acre on the forested portion, 36 of which are greater than 8 inches in diameter. The average net merchantable volume per acre is 2,158 board feet, or 597 cubic feet. Approximately 7 percent of this volume is aspen.

The analysis area contains 17,072 acres, all on Cedar City Ranger District.

Of the total AA acreage, 6,195 acres are available and tentatively suitable for timber production.

6,819 acres are non-forest and occur as brushy or barren south and west aspects, sagebrush areas at lower elevations of broad ridges adjacent to the Forest boundary or as non-forested openings scattered throughout the area. (Most of these areas are identified as 60 or 41 on the timber inventory maps.)

4,058 acres are non-commercial forest lands which occur as sparsely forested areas. These areas produce less than 20 cubic feet/acre/year and occur adjacent to non-forested areas primarily on south and west aspects and ridges. (Most of these areas are identified as 40 on the timber inventory maps.)

3,716 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These areas occur mostly on south and west aspects, ridgetops and in the ponderosa pine/pinyon-juniper ecotone where available soil moisture is very low. Sagebrush is a competing understory species in some places.

A total of 76 acres was identified as pure stands of aspen, all on slopes less than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

6,119 acres of conifer occur on slopes less than 40 percent. All available and tentatively suitable acres are operable for tractor logging in this analysis area.

AA-7. Rolling sideslopes with sagebrush vegetation. Slopes are dominantly less than 40 percent. Bitterbrush and mountain mahogany occur on the higher elevations. This AA occurs on Cedar City Ranger District primarily in the vicinity of Panguitch Lake and contains 16,494 acres. Some of the areas have been harrowed and reseeded. Current management is for livestock forage production and wildlife habitat.

AA-8. Lava flows on plateaus, including both barren flows and unproductive stands of spruce-fir, aspen, ponderosa pine, and mixed conifer. Numerous cinder cones occur in this analysis area. Currently, the area is managed for wildlife and watershed values. Management opportunities are severely limited by the amount of rock outcrop and poor accessibility.

This AA contains 23,753 acres, all of which occur on D-2.

Only 100 acres are available and tentatively suitable for timber production all on slopes less than 40 percent. These 100 acres have the same characteristics as AA-1.

18,293 acres are non-forest and occur as lava flows and cinder cones. A few small meadow openings also occur scattered throughout the AA. (Most of these areas are identified as 60 on the timber inventory maps.)

5,360 acres are non-commercial forest land which are sparsely forested areas growing out of the lava flows where shallow soils have formed. These areas produce less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

AA-13. Forested plateau lands (spruce-fir). Slopes are less than 40 percent. This AA is the most productive spruce-fir type on the Forest. In the past, clearcut strips have been the principle harvest method. Regeneration has been a major problem.

Species composition as of the 1980 timber inventory:

Species	Percent
Engelmann spruce	44
Aspen	27
Alpine fir	25
Douglas-fir	3
White fir	1

The average elevation is 10,000 feet. The dominant slope range is 10 to 20 percent. Site index for Engelmann spruce is 35 feet in 50 years. Average tree age is 90 years. The analysis area averages 913 trees per acre, 91 of which are greater than 8 inches in diameter. The average net merchantable volume per acre is 7,195 board feet, or 1,272 cubic feet. Approximately 20 percent of this volume is aspen.

Cedar City Ranger District	- 10,977 acres
Powell Ranger District	- 344 acres
Escalante Ranger District	- 36,784 acres
Teasdale Ranger District	- 8,600 acres

Of the total AA acreage, 45,017 are available and tentatively suitable for timber production.

38 acres are water (small lakes).

7,509 acres are non-forest and occur as small meadow openings, areas of rock outcrop or other small non-forested openings. (Most of these areas are identified as 60 on the timber inventory maps.)

4,141 acres are non-commercial forest land where productivity is less than 20 cubic feet/acre/year. These areas occur on shallow soil areas adjacent to rock outcrops or adjacent to plateau rims where forest cover is sparse. (Most of these areas are identified as 40 on the timber inventory maps.)

5,670 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. Most of these problems are attributed to the high elevations and associated adverse climatic conditions, shallow ridgetop soils and severe exposure to prevailing wind and winter and spring dessication.

A total of 5,510 acres was identified as pure stands of aspen, all on slopes less than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

37,047 conifer acres occur on slopes less than 40 percent. On slopes over 40 percent, 632 acres are suitable for short span cable logging and 1,828 acres require long span cable or aerial logging methods.

AA-17. Forested slumplands (mixed conifer and aspen). This analysis area includes both tractor ground and steeper topography. It occupies a relatively wide band of land beneath the plateau rims of the Aquarius, Boulder, and Markagunt Plateaus. The area contains many of the Dixie's aspen stands. Numerous small lakes and ponds occur in the undulating slumpland topography making dispersed recreation a major use. At present, very little timber harvest occurs on this AA. Opportunities exist for increased timber harvest, but extreme care is needed in road location and sale layout to avoid initiation of mass movement.

Species	Percent
Aspen	42.7
Engelmann spruce	22.2
Alpine fir	16.4
Douglas-fir	10.5
White fir	6.0
Ponderosa pine	2.2

The average elevation is 9,700 feet. The dominant slope range is 30 to 40 percent. Site index for Douglas-fir is 39 feet in 50 years. Site index for Engelmann spruce is 36 feet in 50 years. Average tree age is 80 years. The analysis area averages 673 trees per acre, 101 of which are larger an 8 inches in diameter. The average net merchantable volume per acre is 5,008 board feet, or 976 cubic feet. Approximately 20 percent of this volume is aspen.

The analysis area contains 85,997 acres:

Cedar City Ranger District - 12,121 acres
Escalante Ranger District - 40,793 acres
Teasdale Ranger District - 33,083 acres

Of the total AA acreage, 17,199 acres are available and tentatively suitable for timber production.

344 acres are water (small lakes).

18,147 acres are non-forest lands and occur as small openings of meadows, sagebrush areas, areas of rock outcrop or talus or other non-forest opening, scattered throughout the unit. (Most of these areas are identified as 60 on the timber inventory maps.)

13,467 acres are non-commercial forest lands which occur as sparsely forested areas producing less than 20 cubic feet/acre/year. These areas are typically associated with narrow rocky ridges, shallow soils near rock outcrops or south and west aspects at lower elevations. (Most of these areas are identified as 40 on the timber inventory maps.)

36,840 acres are classified as unsuitable for timber harvest because of irreversible resource damage. These are areas where slopes exceed 30 percent and/or wet areas occur. It is felt that timber harvest activities (road construction, removal of protective vegetative cover) could initiate mass movement. Until a detailed inventory of active slumps and mass movement hazards is prepared, these areas will be classed as unsuitable.

A total of 10,027 acres was identified as pure stands of aspen, 9,032 acres on slopes less than 40 percent and 993 acres on slopes greater than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

5,375 acres of mixed conifer occur on slopes less than 40 percent. On slopes over 40 percent, 91 acres are suitable for short span cable logging and 1,706 acres require long span cable or aerial logging methods.

AA-19. Forested mountainous plateau lands with steep canyons (mixed conifer). This AA occurs on D-2 and occupies the steep topography north of Bunker Creek. The majority of the area is steeper than 40 percent slopes; however, some tractor logging has occurred or is proposed. The land is moderately productive. Some opportunity exists for cable logging on this area.

Species composition as of the 1980 timber inventory:

Species	Percent
Aspen	40.6
Alpine fir	19.0
Engelmann spruce	13.4
White fir	11.0
Douglas-fir	11.0
Ponderosa pine	5.0

The average elevation is 9,400 feet. The dominant slope range is 30-40 percent. Site index for Douglas-fir is 40 feet in 50 years. Average tree age is 80 years. The analysis area averages 289 trees per acre, 87 of which are greater than 8 inches in diameter. The average net volume per acre is 5,820 board feet, or 1,145 cubic feet. Approximately 20 percent of this volume is aspen.

This analysis area contains 16,601 acres, all on Cedar City Ranger District.

Of the total AA acreage, 8,528 acres are available and tentatively suitable for timber production.

4,149 acres are non-forest land which occur as small openings of meadows, rock outcrop, talus slopes, or other barren or non-forested areas scattered randomly throughout the analysis area. (Most of these areas are identified as 60 and 41 on the timber inventory maps.)

3,924 acres are non-commercial forest land which are sparsely forested areas producing less than 20 cubic feet/acre/year. These areas occur in the areas transitional to pinyon-juniper and mountain brush vegetative types. (Most of these areas are identified as 40 on the timber inventory maps.)

6,862 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These problem areas typically occur on south and west exposures, lower elevations, ridges, and locations with shallow rocky soil.

There were no stands of pure aspen identified within this analysis area.

2,160 acres of mixed conifer occur on slopes less than 40 percent. On slopes over 40 percent, 512 acres are suitable for short span cable logging and 5,856 acres require long span cable or aerial logging methods.

AA-20. Pinyon-juniper benchlands suitable for vegetative manipulation. Slopes are generally less than 40 percent. Most of these areas have been chained and reseeded. They are intensively managed for livestock forage production. Some areas contain mountain mahogany and other mountain brush species at higher elevations. This analysis area contains 82,039 acres:

Pine Valley Ranger District - 45,493 acres
Cedar City Ranger District - 13,680 acres
Powell Ranger District - 10,325 acres
Escalante Ranger District - 4,883 acres
Teasdale Ranger District - 7,658 acres

121 acres are small bodies of water and 81,918 acres are non-forest.

AA-21. Steep hills and mountains with pinyon-juniper. Mountain brush occurs on some of the higher elevations. Slopes are typically greater than 40 percent. Presently, this AA is managed for livestock forage production, wildlife habitat, and watershed. Water developments have been utilized for livestock distribution. There are small areas included that have been chained and reseeded, or are suitable for these activities. Most of the area is too steep or rocky for chaining; however, spraying and/or burning may be options to improve livestock and/or wildlife values. This analysis area contains 405,454 acres:

Pine Valley Ranger District - 139,587 acres
Cedar City Ranger District - 50,163 acres
Powell Ranger District - 58,557 acres
Escalante Ranger District - 96,256 acres
Teasdale Ranger District - 60,891 acres

7 acres are water, 10,950 acres are non-commercial forest land and 394,497 acres are non-forest.

AA-23. Very steep plateau rimlands. This AA occurs just below th plateau rim of the Markagunt, Paunsaugunt, and Table Cliff plateaus. It includes the pink cliffs and associated very steep forested rimlands. These areas have high scenic values. Presently, these areas are managed extensively, primarily for scenic, wildlife, and watershed values. Little opportunity exists for intensive management of any resource.

Species composition as of the 1980 timber inventory:

Species	Percent
White fir	28.9
Douglas-fir	25.0
Aspen	14.8
Engelmann spruce	13.6
Alpine fir	11.7
Ponderosa pine	5.3
Timber pine	.7

The average elevation is 9,000 feet. The dominant slope range is 40 to 50 percent. Site index for Douglas-fir is 38 feet in 50 years. Average tree age is 94 years. The analysis area averages 581 trees per ace, 116 of which are greater than 8 inches in diameter. The average net merchantable volume per acre is 9,758 board feet or 1,875 cubic feet. Approximately 10 percent of this volume is aspen.

This analysis area contains 40,087 acres:

Cedar City Ranger District	- 5,463 acres
Powell Ranger District	- 12,178 acres
Escalante Ranger District	- 22,446 acres

Of the total AA acreage, 685 acres are available and tentatively suitable for timber production. These tentatively suitable acres are located on the Powell Ranger District.

4 acres are water and occur as small lakes.

20,194 acres are non-forest and occur as barren pink cliffs, barren very steep south facing mountain slopes and small meadow or sagebrush openings. (Most of these areas are identified as 60 on the timber inventory maps.)

17,346 acres are non-commercial forest land which are sparsely forested areas producing less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

1,858 acres are classified as unsuitable for timber production because of irreversible resource damage. Past experience indicates that timber harvesting activities (road construction and reduction of canopy and ground cover) could initiate mass movement on some of the geologic formations and soil associations found on steep slopes and/or wet areas in this analysis area. These areas will be classed as unsuitable until a detailed survey is completed to determine hazards and limitations.

No pure stands of aspen are found in this analysis area.

All 685 tentatively suitable acres require long span cable or aerial logging methods.

AA-24. Forested plateau sideslopes (mixed conifer and aspen) primarily below plateau rimlands. Slopes are generally greater than 40 percent; however, there are areas included with more gentle slopes. These areas are currently being managed for scenic, wildlife, and watershed values. Some opportunities exist for managing the aspen stands. Much of the analysis area occurs on the Wasatch-Kaiparowits geologic contract zone which is subject to slumping.

Species composition is the same as that in AA-23.

Elevation, dominant slope range, site index, average tree age, stand density and average timber volume are the same as in AA-23.

This analysis area contains 10,001 acres:

Pine Valley Ranger District - 781 acres
Cedar City Ranger District - 9,220 acres

Of the total AA acreage, 2,890 acres are available and tentatively suitable for timber production.

1,754 acres are non-forest and occur as meadows, sagebrush openings, rock outcrop or other barren or non-forested areas scattered throughout the analysis area. (Most of these areas are identified as 60 on the timber inventory maps.)

4,237 acres are non-commercial forest land which are sparsely forested areas generally on south and west aspects or at lower elevations transitional to non-forested areas. (Most of these areas are identified as 40 on the timber inventory maps.)

1120 acres are unsuitable for timber production because of irreversible resource damage. These areas occur along the Kaiparowits-Wasatch geologic contact zone where severe mass movement problems exist.

961 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These areas typically occur on south and west aspects, lower elevation transition areas and/or ridges generally associated with non-productive or non-commercial forest land.

A total of 768 acres was identified as pure stands of aspen, 360 acres on slopes less than 40 percent and 408 acres on slopes greater than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

1,464 acres of mixed conifer occur on slopes less than 40 percent. On slopes over 40 percent, 73 acres are suitable for short span cable logging and 1,385 acres require long span cable or aerial logging methods.

AA-25. Very steep forested mountainous lands (mixed conifer). This area occurs only on D-3 in the vicinity of Casto Bluff and occupies the more rugged terrain and cliffs on the northern part of the District. Presently, this area is managed for wildlife, watershed, and scenic values. Little opportunity exists for any kind of intensive management.

Species composition, elevation, dominant slope range, tree, stand and volume data are the same as in AA-23.

The analysis area contains 18,429 acres.

660 acres are available and tentatively suitable for timber production.

6,074 acres are non-forest and occur as barren cliffs or other areas of rock outcrop, stands of pinyon-juniper, mountain brush, sagebrush or open grass-forb areas. (Most of these areas are identified as 41 or 60 on the timber inventory maps.)

11,695 acres are non-commerical forest land which are sparsely forested areas generally on south and west aspects and ridge tops. These areas produce less than 20 cubic feet/acre/year. Soils are typically shallow. (Most of these areas are identified as 40 on the timber inventory maps.)

No stands of pure aspen occur in this analysis area.

All 660 tentatively suitable acres require long span cable or aerial logging methods.

AA-26. Low elevation valleys and fans with sagebrush and rabbitbrush. Typically, this analysis area occurres as narrow elongated alluvial valleys in the pinyon-juniper transition zone. Soils are quite erosive and productivity is poor due to low moisture. Most areas have deep gullies bisecting the valleys. Limited opportunities exist for vegetative manipulation. Watershed rehabilitation opportunities exist in some areas. This analysis area contains 2,471 acres, all classified as non-forest and all located on Cedar City Ranger District.

AA-27. High elevation grasslands including alluvial valleys, glaciated valleys, and open parklands. This analysis area is associated primarily with spruce-fir and high elevation mixed conifer forests. They are some of the higher forage producing areas of the forest. Presently, those areas are managed primarily for livestock forage production. Intensive range management opportunities exist. This analysis area contains 9,025 acres of non-forest land, all on Cedar City Ranger District. 38 acres are water, 7,997 acres are non-forest, and 670 acres are non-commercial forest. 320 acres are available, capable, and suitable for timber production; however, these acres are classified as unsuitable for timber production due to irreversible resource damage.

AA-29. Rolling plateau lands with mixture of aspen stands interspersed with sage-grass parks. Sage is dominantly silver sage. These are productive rangelands. Opportunities exist for intensive range and wildlife management. Some of the aspen stands have been logged. Much of the aspen is highly productive. Opportunities exist for intensive management of the aspen.

Species composition as of the 1980 timber inventory:

Species	Percent
Aspen	85.3
Douglas-fir	7.2
Alpine fir	3.2
Engelmann spruce	1.7
Ponderosa pine	1.3
White fir	1.3

The average elevation is 9,300 feet. The dominant slope range is 30 to 40 percent. Site index for aspen is 48 feet in 50 years. Average tree age is 70 years. The analysis area averages 627 trees per acre, 251 of which are greater than 5 inches in diameter. 115 trees per acre are greater than 8 inches in diameter. The average net volume per acre (all species) assuming a minimum merchantability of 8 inches dbh is 4,496 board feet or 1,339 cubic feet. Aspen volume only is 3,642 board feet or 1,165 cubic feet per acre.

This analysis area contains 22,251 acres:

Cedar City Ranger District - 19,344 acres
Powell Ranger District - 2,917 acres

Of the total AA acreage, 4,221 are available and tentatively suitable for timber production.

15,596 acres are non-forest and occur as sage-grass parks interspersed throughout the analysis area. (Most of these areas are identified as 60 on the timber inventory maps.)

2,434 acres are non-commercial forest lands which are sparsely forested areas generally on the steeper slopes or southerly aspects. These areas produce less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

3,375 acres are located on slopes less than 40 percent. On slopes over 40 percent, 846 acres are suitable for short span cable logging.

AA-31. High elevation glaciated plateau lands (spruce-fir). Slopes are less than 40 percent. Productivity is moderate to low due to very high elevations and associated harsh sites. Currently, dead spruce is the only timber being harvested. Opportunities exist for more intensive timber management.

Species composition as of the 1980 timber inventory:

Species	Percent
Engelmann spruce	89.6
Alpine fir	8.7
Aspen	1.7

The average elevation is 10,700 feet. The dominant slope range is 10 to 20 percent. Site index for Engelmann spruce is 31 feet in 50 years. Average tree age is 80 years. The analysis area averages 400 trees per acre, 84 of which are greater than 8 inches in diameter. The average net merchantable volume per acre is 4,881 board feet, or 869 cubic feet. Only one percent of this volume is aspen.

This analysis area contains 22,381 acres:

Escalante Ranger District - 1,082 acres
Teasdale Ranger District - 21,299 acres

Of the total AA acreage, 12,409 acres are available and tentatively suitable for timber production.

81 acres are water (small lakes).

4,538 acres are non-forest and occur as small grass-forb parklands interspersed randomly throughout the analysis area. (Most of these areas are identified as 60 on the timber inventory maps.)

5,353 acres are non-commercial forest lands producing less than 20 cubic feet/acre/year. These areas occur as sparsely forested areas on shallow, rocky soils on small ridges and near the plateau rim. (Most of these areas are identified as 40 on the timber inventory maps.)

6,714 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These problems are attributed to severe exposure at high elevations, very shallow and poorly developed soils, and rocky sites near the plateau rim.

41 acres were identified as pure aspen stands on slopes less than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

12,368 acres of conifer are located on slopes less than 40 percent. Much of this analysis area is extremely rocky on the surface where large boulders are common. This condition may restrict tractor logging in some areas.

AA-32. Steep rockland. Mostly barren, some pinyon-juniper. Presently, these areas are managed at minimum level, mainly for watershed, wildlife, and scenic values. Management options are extremely limited. This analysis area contains 6,964 acres:

Pine Valley Ranger District - 4,223 acres
Escalante Ranger District - 2,235 acres
Teasdale Ranger District - 506 acres

AA-33. Badlands, very erosive soils, mostly barren, some pinyon-juniper and scattered ponderosa pine. This area only occurs in Henderson Canyon area of D-4. It has very low productivity. Management options are severely restricted by steep slopes, low soil productivity, inaccessibility, and adverse climate. Large amounts of sediment are produced during high intensity short duration summer thunder storms. This analysis area contains 17,501 acres.

AA-34. Rolling plateau lands (sagebrush). This area occurs on the Awapa Plateau of D-4 and D-5. Presently, the area is managed for livestock forage and wildlife habitat. Opportunities exist for intensive wildlife and livestock forage production. Spraying, burning, reseeding, and water development are potential opportunities on portions of it. This analysis area contains 24,991 acres:

Escalante Ranger District - 5,508 acres
Teasdale Ranger District - 19,483 acres

24,127 acres are non-forest and 864 acres are non-commercial forest land.

AA-35. Forested plateau lands (aspen-conifer). Slopes are generally less than 40 percent. Presently, both aspen and conifer are being harvested. Productivity is moderate. Opportunities exist for more intensive timber management, particularly in the aspen type.

Species composition, elevation, dominant slope range, tree, stand and volume data are the same as in AA-1.

This analysis area contains 28,772 acres:

Escalante Ranger District - 15,509 acres
Teasdale Ranger District - 13,263 acres

Of the total AA acreage, 18,314 acres are available and tentatively suitable for timber production.

29 acres are water (small lakes).
6,884 acres are non-forested and occur as small meadows or other openings scattered throughout the analysis area. Rock outcrop and talus slopes are also included. (Most of these areas are identified as 60 on the timber inventory maps.)

3,545 acres are non-commercial forest land which produce less than 20 cubic feet/acre/year. These areas occur on southerly aspects, on ridges, and at lower elevations in transition zones. (Most of these areas are identified as 40 on the timber inventory maps.)

6,967 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These areas occur on shallow droughty soils, particularly adjacent to non-commercial forest land and near transition zones at lower elevations.

2,063 acres were identified as pure stands of aspen, all on slopes less than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

19,310 acres of mixed conifer are on slopes less than 40 percent. 147 acres are on slopes greater than 40 percent and require long span cable or aerial logging methods.

AA-36. High elevation glaciated plateau lands with alpine grass-forb vegetation. Small clumps of spruce-fir are included with this analysis area. Productivity is poor. Presently, the area is managed for livestock forage production; however, the season of use is short due to the extreme high elevation, short growing season, and fragile nature of the soils and vegetation.

Species composition, elevation, dominant slope range, tree, stand and volume data are the same as in AA-31.

This analysis area contains 28,409 acres:

Cedar City Ranger District - 1,403 acres
Escalante Ranger District - 47 acres
Teasdale Ranger District - 26,959 acres

Of the total AA acreage, 1,751 are available and tentatively suitable for timber production.

844 acres are water which occurs as small lakes.

23,885 acres are non-forest land which occurs as open dry meadow land with a grass-forb vegetative community. (Most of these areas are identified as 60 on the timber inventory maps.)

1,929 acres are non-commercial forest land which are sparsely forested areas producing less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.

All 1,751 tentatively suitable acres were identified as having regeneration problems for the same reasons indicated for similar areas in AA-31. These acres are all on slopes less than 40 percent.

AA-37. Rolling to moderately steep plateau sideslopes with oakbrush vegetation. This area generally occurs adjacent to the ponderosa pine zone on D-4, typically a transition area between the ponderosa pine zone below and the slumplands above. Productivity is high; however, the area is presently managed for watershed and wildlife values. Limited opportunities exist for increasing livestock forage and wildlife habitat improvement through burning or other means of vegetative manipulation. This analysis area contains 5,635 acres. One acre is water, 240 acres are non-commercial forest land and 5,394 acres are non-forest.

AA-38. Alluvial fans, bottomlands, and pediments (sagebrush). These areas occur mostly on D-3 adjacent to State Highway U-12 in the Johnson Branch area and on the edges of John's Valley on both D-3 and D-4. Much of the area has had intensive range management activities (vegetation manipulation). Other areas are suited for such treatment. Some watershed rehabilitation work has been completed. Opportunities exist for further treatment. This analysis area contains 69,068 acres:

Pine Valley Ranger District - 2,875 acres
Cedar City Ranger District - 4,525 acres
Powell Ranger District - 46,471 acres
Escalante Ranger District - 14,271 acres
Teasdale Ranger District - 926 acres

179 acres are water. 67,489 acres are non-forest and 1,400 acres are non-commercial forest land.

AA-39. Low hills and benchlands (ponderosa pine). Slopes are generally less than 40 percent. Productivity is low. Soils are highly erosive. This analysis area occurs in the central portion of D-3 and the southwestern portions of D-4. These areas are the lower elevation transitional zones of the ponderosa pine type. Little opportunity exists for more intensive management than occurs presently.

Species composition, elevation, dominant slope range, tree, stand and volume data are the same as AA-6.

This analysis area occupies 45,670 acres:

Powell Ranger District - 25,377 acres
Escalante Ranger District - 20,293 acres

Of the total AA acreage, 7,687 are available and tentatively suitable for timber production.

6,739 acres are non-forest and occur as narrow sagebrush valleys and benchlands, droughty southerly aspects on steep slopes, and stands of brush and pinyon-juniper at the lower elevations near the transition zone. (Most of these areas are identified as 41 or 60 on the timber inventory maps.)

17,543 acres are non-commercial forest land which produce less than 20 cubic feet/acre/year. These areas occur on the more drought ridden sites, particularly southerly aspects of steep slopes and at lower elevations where soils are shallow. (Most of these areas are identified as 40 on the timber inventory maps.)

13,701 acres are classified as unsuitable for timber production because of irreversible resource damage. These areas generally occur adjacent to areas of non-commercial forest land. Shallow, droughty soil and low seasonal rainfall are severely limiting factors. A moderate to dense understory of manzanita is common in these areas.

No pure stands of aspen occur in this analysis area. 20,637 tentatively suitable acres occur on slopes less than 40 percent. On slopes over 40 percent, 751 acres are suitable for short span cable logging.

AA-40. Steep hills and mountains on the northern part of D-3 with mountain brush and sage. Topography is rugged with slopes generally greater than 40 percent. Presently, these areas are managed for range, wildlife, and watershed values. Management is extensive. Little opportunity exists for intensive management, other than limited vegetative manipulation projects and water developments. This analysis area contains 31,615 acres, all on Powell Ranger District. 26,250 acres are non-forest and 5,365 acres are non-commercial forest land.

AA-41. Steep mountain sideslopes (spruce-fir). Slopes are generally greater than 40 percent. Some areas have been tractor logged in the past. Opportunities exist for intensive timber management with use of cable logging systems.

Species composition, elevation, tree, stand and volume data are the same as in AA-13. Dominant slope range is 30 to 50 percent.

This analysis area contains 831 acres, all located on Powell Ranger District.

Of the total AA acreage, 779 are available and tentatively suitable for timber production.

12 acres are non-forest and occur as small openings of rock outcrop, or non-forested meadow or sagebrush areas.

40 acres are non-commercial forest land occurring on sparsely vegetated areas which produce less than 20 cubic feet/acre/year. (These areas are generally identified as 40 on the timber inventory maps.)

164 acres were identified as pure stands of aspen, all on slopes less than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

276 acres of conifer occur on slopes less than 40 percent. On slopes over 40 percent, 339 acres are suitable for short span cable logging.

AA-42. Forested lands of transition zones, unsuitable for timber production. Present management is primarily for wildlife and watershed values. Little opportunity exists for intensive management.
This analysis area contains 5,094 acres:

Powell Ranger District - 2,955 acres
Escalante Ranger District - 523 acres
Teasdale Ranger District - 1,616 acres

2,880 acres are non-forest land and occur as open mountain brush, pinyon-juniper, sagebrush hillslopes or rock outcrop areas. (Most of these areas are identified as 41 or 60 on the timber inventory maps.)

2,214 acres are non-commercial forest land which occur as sparsely forested areas which produce less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

AA-44. Rolling plateau lands on the northwest portion of Powell Ranger District with sage-grass vegetation. Slopes are generally less than 40 percent. These areas are presently managed for livestock forage, wildlife habitat, and watershed. Some burning has been proposed for wildlife habitat improvement. Some opportunities exist for more intensive range management and wildlife habitat improvement. This analysis area contains 15,586 acres, 15,066 acres are non-forest and 520 acres are non-commercial forest land.

AA-45. Rolling plateau lands with grass-forb and aspen vegetation. Slopes are less than 40 percent. Productivity is low. Current management is for wildlife and watershed values. Little opportunity exists for intensive timber management. Some opportunities exist for wildlife habitat improvement.

This analysis area contains 1,330 acres, all of which occur on D-3.

1,105 acres are non-forest land and occur as rolling topography occupied by grass-forb vegetation. (Most of these areas are identified as 60 on the timber inventory maps.)

225 acres are non-commercial forest land which are forested areas producing less than 20 cubic feet/acre/year.

AA-47. Moderately steep to steep stony foothills with mountain brush vegetation at the foot of the Pine Valley Mountains and the western hills of D-1. Present management is extensive, primarily for wildlife, watershed, and some range values. Little opportunity exists for intensive management, except small vegetation manipulation projects. This analysis area contains 111,379 acres, 104,644 acres are non-forest and 6,735 acres are non-commercial forest land.

AA-50. Benches and sideslopes with sagebrush, bitterbrush, and scattered aspen pockets. Occurs only on D-4 and D-5. Present management is for livestock forage, wildlife, and watershed. Some vegetative manipulation and reseeding has occurred or is planned on some areas. Opportunities exist for more intensive range and wildlife management, primarily spraying, burning, and reseeding. This analysis area contains 18,942 acres:

Escalante Ranger District - 14,100 acres
Teasdale Ranger District - 4,842 acres

37 acres are water and occur as small lakes scattered throughout the analysis area.

18,095 acres are non-forest and 810 acres are non-commercial forest land.

AA-51. Very steep rocky rimlands of the Aquarius Plateau, including slumplands below the escarpment. Management options are severely limited by inaccessibility and steep rugged rocky topography. Present management is primarily for wildlife, scenic, and watershed values.

Species composition, elevation, tree, stand and volume data are the same as in AA-1. The dominant slope range is 40 to 60 percent.

This analysis area contains 11,089 acres, all on Escalante Ranger District.

There are 2,218 acres available and tentatively suitable for timber production. These areas generally occur on the lower slopes of the analysis area and occupy forested areas with slopes of less than 30 percent.

44 acres are water and occur as small lakes scattered throughout the analysis area below the escarpment.

2,285 acres are non-forest and occur as rocky escarpments, small meadows or other non-forested openings. (Most of these areas are identified as 60 on the timber inventory maps.)

1,774 acres are non-commercial forest land and occur as sparsely forested areas which produce less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

4,768 acres are classified as unsuitable for timber production because of potential irreversible resource damage. These are areas where slopes exceed 30 percent and/or wet areas occur. It is felt that timber harvest activities (road construction, removal of protective vegetative cover) could initiate mass movement. Until an inventory of active slumps and mass movement hazards is prepared, these areas will be classed as unsuitable for timber production.

All 2,218 tentatively suitable acres require long span cable or aerial logging methods.

AA-54. Open grass-sage-forb areas on the Aquarius Plateau interspersed between spruce-fir and mixed conifer forested plateau lands. Productivity is moderate. These areas are presently managed primarily for livestock forage production and wildlife habitat. Opportunities exist for more intensive range and wildlife management. This analysis area contains 41,812 acres:

Escalante Ranger District	- 22,733 acres
Teasdale Ranger District	- 19,079 acres

571 acres consist of small lakes. 40,601 acres are non-forest. 340 acres are classified as unsuitable for timber production because of potential irreversible resource damage. 300 acres are available, capable and suitable for timber production and occur on slopes less than 40 percent. These 300 acres have regeneration problems that would require higher than normal costs to achieve adequate regeneration and otherwise have the same characteristics as the timbered portion of AA-35.

AA-55. Barker Reservoir, Donkey Reservoir, and Rim lakes recreation areas. These areas have the same physical characteristics as AA-17.

Species composition, elevation, tree, stand and volume data are the same as in AA-17. Dominant slope range is 20 to 40 percent.

This analysis area contains 20,224 acres:

Escalante Ranger District - 12,650 acres
Teasdale Ranger District - 7,574 acres

Of the total AA acreage, 4,045 acres are available and tentatively suitable for timber production.

487 acres are water (small lakes).

2,839 acres are non-forest and occur as openings of meadow, sagebrush, and/or rock outcrop. (Most of these areas are identified as 60 on the timber inventory maps.)

4,640 acres are non-commercial forest lands which are sparsely forested areas producing less than 20 cubic feet/acre/year. These areas are typically associated with narrow rocky ridges, shallow soils near rock outcrops or south and west aspects at lower elevations. (Most of these areas are identified as 40 on the timber inventory maps.)

8,213 acres are classified as unsuitable for timber harvest because of irreversible resource damage. These are areas where slopes exceed 30 percent and/or wet areas occur. It is felt that timber harvest activities (road construction, removal of protective vegetative cover) could initiate mass movement. Until a detailed inventory of active slumps and mass movement hazards is prepared, the areas will be classified as unsuitable.

1,697 acres were identified as pure stands of aspen, all on slopes less than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

2,106 acres of mixed conifer occur on slopes less than 40 percent. On slopes over 40 percent, 12 acres are suitable for short span cable logging and 230 acres require long span cable or aerial logging methods.

AA-57. Forested plateau lands (mixed conifer). Slopes are generally greater than 40 percent. These are generally the areas that have not been logged on D-3 in the mixed conifer type because of steep slopes. Most of these stands are in very poor condition due to dwarf mistletoe in the Douglas-fir. Much of this analysis area is suitable for timber harvest with cable systems and some is suitable for tractor logging. Areas of this analysis area in the vicinity of the East Fork Sevier River and its' tributaries occur on the Wasatch-Kaiparowits geologic contact zone and are subject to slumping.

Species composition as of the 1980 timber inventory:

Species	Percent
White fir	37.2
Douglas-fir	28.9
Ponderosa pine	14.1
Aspen	8.3
Alpine fir	6.4
Engelmann spruce	5.1

The average elevation is 8,800 feet. Dominant slope range is 40 to 50 percent. Site index for Douglas-fir is 40 feet in 50 years. Average tree age is 100 years. The analysis area averages 480 trees per acre, 82 of which are larger than 8 inches in diameter. The average net merchantable volume per acre is 5,544 board feet, or 1,215 cubic feet. Approximately 7 percent of this volume is aspen.

This analysis area contains 32,099 acres:

Powell Ranger District	- 31,627 acres
Escalante Ranger District	- 472 acres

Of the total AA acreage, 23,815 are available and tentatively suitable for timber production.

438 acres are non-forest and occur as small meadows or barren rocky slopes on south and west aspects. (Most of these areas are identified as 60 on the timber inventory maps.)

1,421 acres are non-commercial forest land which are sparsely forested areas that produce less than 20 cubic feet/acre/year. These areas generally occur on south and west aspects and ridge tops where soils are shallow and the site is droughty. (Most of theses areas are identified as 40 on the timber inventory maps.)

6,425 acres are classified as unsuitable for timber harvest because of irreversible resource damage potential on areas prone to slumping. Timber harvesting activities could initiate mass soil movement. These areas will be classed as unsuitable until a detailed inventory of active slumps and mass movement is completed.

A total of 336 acres of pure aspen stands was identified within the analysis area, all on slopes less than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

7,502 acres of mixed conifer occur on slopes less than 40 percent. On slopes over 40 percent, 15,692 acres are suitable for short span cable logging and 275 acres require long span cable or aerial logging methods.

6,425 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These areas occur on south and west aspects and ridges, generally adjacent to areas of non-commercial forest land.

AA-60. Steep mountain slopes with mixed conifer-aspen vegetation on north aspects and mountain brush-sage on south aspects. Slopes are generally greater than 40 percent. Under current management, these areas are managed primarily for livestock forage production and wildlife and watershed values.

Species composition, elevation, tree, stand and volume data are the same as AA-1. Dominant slope range is 40 to 60 percent.

This analysis area contains 56,382 acres:

Powell Ranger District	- 43,931 acres
Cedar City Ranger District	- 12,451 acres

Of the total AA acreage, 989 acres are available and tentatively suitable for timber production.

23,039 acres are non-forest lands and occur primarily on south and west aspects with mountain brush or sage vegetation. Small meadows and areas of rock outcrop also occur scattered throughout the area. (Most of these areas are identified as 60 on the timber inventory maps.)

29,702 acres are non-commercial forest land which are sparsely forested areas producing less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

2,652 acres are unsuitable for timber production because of irreversible resource damage. These areas occur on very steep slopes usually associated with wet areas or evidence of unstable soils.

All 989 tentatively suitable acres require long span cable or aerial logging methods.

AA-61. Major water bodies - Navajo Lake, Panguitch Lake, etc. This analysis area contains 1,873 acres:

Cedar City Ranger District	- 1,546 acres
Powell Ranger District	- 149 acres
Escalante Ranger District	- 178 acres

AA-62. Twisted Forest Recreation area on D-2. Bristlecone pine-limber pine vegetation on shallow limestone soil.

This AA contains 310 acres. 269 acres are non-forest and 41 acres are non-commercial forest land.

This area is currently managed primarily for scenic and recreational values.

AA-63. Steep mountain sideslopes (spruce-fir). This area has the same physical characteristics as AA-41 except it is inaccessible by roads.

Species composition, elevation, dominant slope range, tree, stand and volume data are the same as AA-41.

There are 3,227 acres in this analysis area, all on Powell Ranger District. AL1 3,227 acres are available and tentatively suitable for timber production, but require aerial logging methods.

AA-70. Same characteristics as AA-1, except this analysis area has generally been cut over.

Species composition as of the 1980 timber inventory:

Species	Percent
Alpine fir	26.4
Douglas-fir	20.8
Ponderosa pine	16.8
Aspen	16.7
White fir	10.4
Engelmann spruce	4.9
Limber pine	4.2

The average elevation is 8,600 feet. The dominant slope range is 20 to 30 percent. Site index for Douglas-fir is 44 feet in 50 years. Average tree age is 86 years. The analysis area averages 593 trees per acre, 89 of which are larger than 8 inches in diameter. The average net merchantable volume per acre is 5,191 board feet, or 1,128 cubic feet. Approximately 23 percent of this volume is aspen.

This analysis area contains 8,439 acres:

Cedar City Ranger District - 5,804 acres
Escalante Ranger District - 2,635 acres

Of the total AA acreage, 7,108 acres are available and tentatively suitable for timber production.

991 acres are non-forest. (Most of these acres are identified as 60 on the timber inventory maps.) They are typically small meadow openings or barren rocky areas on southerly aspects.

340 acres are non-commercial forest lands which occur as sparsely forested areas which produce less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

397 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation. These areas occur on south and west aspects and ridges where soils are shallow and sites are droughty.

A total of 412 acres was identified as pure stands of aspen. 371 acres are on slopes less than 40 percent and 41 acres on slopes greater than 40 percent.

5,909 acres of mixed conifer occur on slopes less than 40 percent. On slopes over 40 percent, 40 acres are suitable for short span cable and 747 acres require long span cable or aerial logging methods.

AA-71. This analysis area has similar characteristics to AA-13 except AA-71 has generally been cut over.

Species composition as of the 1980 timber inventory:

Species	Percent
Engelmann spruce	50.8
Alpine fir	35.2
Aspen	13.4
Douglas-fir	.6
Ponderosa pine	5.0

The average elevation is 10,000 feet. The dominant slope range is 20 to 30 percent. Site index for Engelmann spruce is 41 feet in 50 years. Average tree age is 85 years. The analysis area averages 549 trees per acre, 93 of which are larger than 8 inches in diameter. The average net merchantable volume per acre is 11,632 board feet, or 1,940 cubic feet. Approximately 12 percent of this volume is aspen.

This analysis area contains 7,556 acres:

Cedar City Ranger District - 1,921 acres
Powell Ranger District - 71 acres
Escalante Ranger District - 3,374 acres
Teasdale Ranger District - 2,190 acres

Of the total AA acreage, 6,416 are available and tentatively suitable for timber production.

740 acres are non-forest and occur as small meadow openings or barren rocky areas scattered throughout the area. (Most of these areas are identified as 60 on the timber inventory maps.)

400 acres are non-commercial forest lands which are sparsely forested areas producing less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

756 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate reforestation.

729 acres were identified as pure stands of aspen, all on slopes less than 40 percent.

5,687 acres of conifer occur on slopes less than 40 percent.

AA-72. Same characteristics as AA-29 except the aspen has been clearcut.

There are 202 acres in this analysis area, all of which occur on D-2. 174 acres are available and tentatively suitable for timber production.

28 acres are non-forest land and occur as small meadow openings or barren rocky areas. (These areas are identified as 60 on the timber inventory maps.)

AA-73. This analysis area is similar to AA-57 except it contains slopes mostly less than 40 percent and has generally been cut over.

Species composition as of the 1980 timber inventory:

Species	Percent
White fir	39.9
Douglas-fir	23.4
Ponderosa pine	19.1
Aspen	12.8
Alpine fir	2.7
Engelmann spruce	2.1

The average elevation is 8,800 feet. The dominant slope range is 30 to 40 percent. Site index for Douglas-fir is 41 feet in 50 years. Average tree age is 93. The analysis area averages 385 trees per acre, 62 of which are greater than 8 inches in diameter. The average net merchantable volume per acre is 4,379 board feet, or 958 cubic feet. Aspen volume is not significant (less than 5 percent).

This analysis area contains 8,252 acres, all on Powell Ranger District.

Of the total AA acreage, 8,140 are available and tentatively suitable for timber production.

30 acres are non-forest and occur as small meadow openings or barren rocky areas. (Most of these areas are identified as 60 on the timber inventory maps).

82 acres are classified as unsuitable for timber production because of potential irreversible resource damage. It is anticipated that timber harvest activities on these areas would result in loss of soil productivity due to unacceptable amounts of soil erosion.

238 acres were identified as having regeneration problems that would require higher than normal costs to achieve adequate regeneration. These areas generally occur on south and west aspects and ridgetops.

27 acres were identified as pure stands of aspen, all on slopes less than 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

7,717 acres of conifer occupy slopes less than 40 percent. 396 acres require logging by short span cable.

AA-74. Same characteristics as AA-1, except they have been clearcut. They are presently stocked.

There are 2,378 acres in this analysis area.

Cedar City Ranger District - 116 acres
Powell Ranger District - 2,075 acres
Escalante Ranger District - 187 acres

2,340 acres are available and tentatively suitable for timber production.

38 acres are non-forest and occur as small meadow openings on barren rocky areas. (These areas are generally identified as 60 on the timber inventory maps.)

AA-75. Same characteristics as AA-74 except they are non-stocked.

There are 388 acres in this analysis area.

Cedar City Ranger District - 161 acres
Powell Ranger District - 227 acres

There are 372 acres available and tentatively suitable for timber production.

16 acres are non-forest and occur as small meadow openings on barren rocky areas.

372 acres are classified as having regeneration problems. These areas have not been able to regenerate to proper stocking levels following timber harvest. Higher than normal costs will be required to obtain adequate reforestation on these areas.

AA-76. Same characteristics ass AA-13, except they have been clearcut. They are presently stocked.

There are 3,475 acres in this analysis area.

Cedar City Ranger District - 1,306 acres
Powell Ranger District - 657 acres
Escalante Ranger District - 1,420 acres
Teasdale Ranger District - 92 acres

There are 3,137 acres available and tentatively suitable for timber production. 106 acres are stands of pure aspen on slopes less than 40 percent. These areas were added to analysis area 29 in the FORPLAN model. 2,904 acres of conifer are on slopes less than 40 percent. On slopes over 40 percent, 127 acres require short span cable logging.

119 acres are non-forest and occur as small meadow openings or barren rocky areas. (Most of these areas are identified as 60 on the timber inventory maps.)

219 acres are non-commercial forest lands which occur as sparsely forested areas producing less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

642 acres are classified as having regeneration problems. Poor regeneration is attributed to high elevation and associated adverse climatic conditions, particularly adjacent to the plateau rim where high wind velocities occur. Higher than normal costs will be required to obtain adequate reforestation on these areas.

AA-77. Same characteristics as AA-76 except they are non-stocked.

There are 109 acres in this analysis area.

Cedar City Ranger District	- 49 acres
Powell Ranger District	- 60 acres

98 acres are tentatively suitable for timber production.

3 acres are non-forest lands.

8 acres are non-commercial forest lands which are sparsely forested producing less than 20 cubic feet/acre/year.

98 acres are classified as having regeneration problems. These areas have not been able to be regenerated to proper stocking levels following timber harvest. Higher than normal costs will be required to obtain adequate reforestation on these areas.

AA-78. Ponderosa pine clearcuts, stocked. Same characteristics as AA-3.

There are 1,797 acres in this analysis area.

Cedar City Ranger District	- 21 acres
Escalante Ranger District	- 1,474 acres
Teasdale Ranger District	- 302 acres

There are 1,614 acres available and tentatively suitable for timber production.

180 acres are non-forest land occurring as small meadow or sagebrush openings or barren rocky areas. (Most of these areas are identified as 60 on the timber inventory maps.)

3 acres are non-commercial forest lands which occur as sparsely forested areas.

147 acres are classified as having regeneration problems. These areas typically occur on southerly exposures where soils are shallow and sites are droughty. Higher than normal costs will be required to obtain adequate reforestation on these areas.

AA-79. Ponderosa pine clearcuts, non-stocked. Same characteristics as AA-3.

There are 809 acres in this analysis area, all of which occur on D-5. All acres are available and tentatively suitable for timber production.

200 acres are classified as having regeneration problems. These areas occur on southerly aspects where soils are shallow and rocky and sites are droughty. Higher than normal costs will be required to obtain adequate reforestation on these areas.

AA-120. Same characteristics as AA-20; however, it is ungrazed. Occurs only on D-1 at the base of the Pine Valley Mountains. This analysis area contains 746 acres.

AA-121. Same characteristics as AA-21; however, it is ungrazed. Occurs only on D-1 at the base of the Pine Valley Mountains. This analysis area contains 34,350 acres.

AA-147. Same characteristics as AA-47; however, it is ungrazed. Occurs only on D-1 at the base of the Pine Valley Mountains. This analysis area contains 8,164 acres. 8,004 acres are non-forest and 160 acres are non-commercial forest land.

AA-148. Steep scarplands of the Pine Valley Mountains. It consists of barren to sparsely forested extremely steep slopes or cliffs. This AA occurs outside of the Pine Valley Wilderness Area. Current management is primarily for scenic, wildlife, and watershed values. This AA contains 492 acres, all of which are non-commercial forest land.

AA-202. Tropic Reservoir Recreation Area. Has same characteristics as AA-2. This analysis area contains 243 acres.

AA-203. Tropic Reservoir Recreation Area. Has same characteristics as AA-3. This AA contains 206 acres. 16 acres are non-forest. The remaining 190 acres are available and tentatively suitable for timber production. All slopes are less than 40 percent.

AA-257. Tropic Reservoir Recreation Area. Has same characteristics as AA-57. This AA contains 477 acres, all of which are available and tentatively suitable for timber production. All 477 acres require short span cable logging.

AA-317. Teasdale Municipal Watershed. Has same characteristics as AA-17. This AA contains 3,407 acres. There are 145 acres available and tentatively suitable for timber production.

50 acres are water which occur as small lakes.

535 acres are non-forest and occur as small openings of meadows, sagebrush areas, areas of rock outcrop or talus, or other non-forest opening scattered throughout the unit. (Most of these areas are identified as 60 on the timber inventory maps.)

2,120 acres are non-commercial forest land which are sparsely forested areas producing less than 20 cubic feet/acre/year. (Most of these areas are identified as 40 on the timber inventory maps.)

557 acres are unsuited for timber production because of potential irreversible resource damage. These are areas where slopes exceed 30 percent and/or wet

areas occur. It is felt that timber harvest activities could initiate mass soil movement. Until a detailed inventory of active slumps and mass movement hazards is prepared, these areas will be classified as unsuitable.

AA-321. Teasdale and Brian Head Municipal Watersheds. Has same characteristics as AA-21. This analysis area contains 3,662 acres:

Cedar City Ranger District	200 acres
Teasdale Ranger District	3,462 acres

2 acres are water, 3,460 acres are non-forest and 200 acres are non-commercial forest land.

AA-331. Teasdale Municipal Watershed. Has same characteristics as AA-31. The AA contains 621 acres. 500 acres are available and tentatively suitable for timber production.

21 acres are non-forest and occur as dry meadow openings (identified as 60 on timber inventory maps.)

100 acres are non-commercial forest land which are sparsely forested and produce less than 20 cubic feet/acre/year.

100 acres are classified as having regeneration problems. This is due to the extreme high elevation with associated adverse climatic and soil conditions. Higher than normal costs will be required to obtain adequate regeneration on these areas.

AA-336. Teasdale Municipal Watershed. Has same characteristics as AA-36. This analysis area contains 909 acres. 70 acres are water, 759 acres are non-forest and 80 acres are non-commercial forest land.

AA-420. Wild horse and Burro Territory. Has same characteristics as AA-20. This analysis area contains 6,123 acres, all on Pine Valley Ranger District.

AA-421. Wild horse and Burro Territory. Has same characteristics as AA-21. This analysis area contains 16,119 acres, all on Pine Valley Ranger District.

AA-503. Box Death Hollow Wilderness Area. Has same characteristics as AA-3. There are 160 acres of noncommercial forest land in this AA, all on Escalante Ranger District.

AA-520. Box Death Hollow Wilderness Area. Has same characteristics as AA-20. This analysis area contains 965 acres of non-forest, all on Escalante Ranger District.

AA-521. Box Death Hollow Wilderness Area. Has same characteristics as AA-21. This analysis area contains 7,080 acres of non-forest, all on Escalante Ranger District.

AA-526. Box Death Hollow Wilderness Area. Has same characteristics as AA-26. This analysis area contains 81 acres of non-forest, all on Escalante Ranger District.

AA-532. Box Death Hollow Wilderness Area. Has same characteristics as AA-32. This analysis area contains 15,070 acres of non-forest, all on Escalante Ranger District.

AA-542. Box Death Hollow Wilderness Area. Has characteristics similar to AA-42 and 39. This AA contains 2,644 acres, all on Escalante Ranger District.

540 acres are non-forest consisting primarily of rock outcrop and barren slopes on pinyon-juniper areas. (41 and 60 on timber inventory maps.)

1,904 acres are non-commercial forest land which occurs as sparsely forested areas producing less than 20 cubic feet/acre/year. (Primarily 40 on timber inventory maps.)

200 acres of commercial forest land are unavailable for timber harvest.

AA-601. Navajo Lake Recreation Area. Has same characteristics as AA-1. This AA contains 3,262 acres, all on Cedar City Ranger District. There are 2,065 acres available and tentatively suitable for timber production.

815 acres are non-forest and occur as small meadows, rock outcrop areas, or other non-forested openings scattered through the area.

382 acres are non-commercial forest land and occur as sparsely forested areas which produce less than 20 cubic feet/acre/year. These are typically shallow soil areas with manzanita as the dominant understory vegetation. (Most of these areas are identified as 40 on the timber inventory maps.)

AA-602. Navajo Lake Recreation Area. Has same characteristics as AA-2. This analysis area contains 297 acres, all on Cedar City Ranger District.

AA-603. Navajo Lake Recreation Area. Has same characteristics as AA-3. This AA contains 332 acres, all on Cedar City Ranger District. 294 acres are available and tentatively suitable for timber production. The remaining 38 acres are non-forest land.

AA-608. Navajo Lake Recreation Area. Has same characteristics as AA-8. The AA contains 1,230 acres, all on Cedar City Ranger District. 630 acres are non-forest land which occurs as basalt flows. The remaining 600 acres are non-commercial forest land.

AA-621. Pine Valley Mountains Wilderness Area (ungrazed portion). Has same characteristics as AA-32. This analysis are contains 9,498 acres, all non-forest.

AA-623. Ashdown Gorge Wilderness Area. Has same characteristics as AA-23.

This analysis area contains 919 acres, all on the Cedar City Ranger District.

301 acres are non-forest, consisting mostly of barren, rocky areas.

313 acres are sparsely forested acres and are classified as non-commercial (not capable of producing 20 cubic feet of timber per acre per year).

305 acres of commercial forest land are unavailable for timber harvest.

AA-624. Ashdown Wilderness Area. Has same characteristics as AA-24.

This analysis area contains 5,533 acres, all on the Cedar City Ranger District.

758 acres are non-forest, consisting mostly of barren rocky areas.

2,655 acres are sparsely forested areas and are classified as non-commercial (not capable of producing 20 cubic feet of timber per acre per year).

2,120 acres of commercial forest land are unavailable for timber harvest.

AA-632. Pine Valley Mountains Wilderness Area (ungrazed portion). Has same characteristics as AA-32. This analysis area contains 779 acres of non-forest land all on the Pine Valley Ranger District.

AA-647. Pine Valley Mountains Wilderness Area (grazed portion). Has same characteristics as AA-47. This analysis area contain 2,063 acres, all non-forest.

AA-648. Pine Valley Mountains Wilderness Area (grazed portion). The timbered portion is similar to AA-39 except slopes are over 40 percent.

This analysis area contains 4,217 acres, all on Pine Valley Ranger District.

3,863 acres are non-commercial forest land (not capable of producing 20 cubic feet of timber per acre per year). 354 acres of commercial forest land are unavailable for timber harvest.

AA-649. Pine Valley Mountains Wilderness Area (grazed portion). This analysis area occupies the forested top of the Pine Valley Mountains and is mostly similar to AA-60 except the topography is more severely dissected.

This analysis area contains 13,744 acres, all on Pine Valley Ranger District.

1,535 acres are non-forest and consist of rocky, barren areas or small meadows.

1,700 acres are non-commercial forest land.

10,509 acres are tentatively suitable for timber production, but are not available because of the wilderness designation.

AA-697. Pine Valley Mountains Wilderness Area (ungrazed portion). Has same characteristics as AA-47. Within this 6,481 acre analysis area, there are 929 acres of non-commercial forest land. The remaining acres are non-forest lands.

AA-698. Pine Valley Mountains Wilderness Area (ungrazed portion). This analysis has characteristics of AA-148, and AA-23 for the forested portion.

The analysis area contains 10,439 acres, all located on Pine Valley Ranger District.

2,285 acres are non-forest.

6,172 acres are non-commercial forest land.

1,982 acres of commercial forest land are unavailable for timber harvest.

AA-699. Pine Valley Mountains Wilderness Area (ungrazed portion). This analysis areas has characteristics of AA-649.

The analysis area contains 13,070 acres, all located on the Pine Valley Ranger District.

410 acres are non-forest.

630 acres are non-commercial forest land.

12,030 acres of commercial forest land are unavailable for timber harvest.

AA-702. Panguitch Lake Recreation Area. Has same characteristics as AA-2. This analysis area contains 712 acres, all non-forest on Cedar City Ranger District.

AA-703. Panguitch Lake Recreation Area. Has same characteristics as AA-3. This AA contains 164 acres. 143 acres are available and tentatively suitable for timber production.

8 acres are non-forest.

13 acres are non-commercial forest land.

36 acres have regeneration problems that will require higher than normal costs to obtain adequate reforestation.

AA-705. Panguitch Lake Recreation Area. Has same characteristics as AA-5.

This analysis area contains 191 acres, all on Cedar City Ranger District.

130 acres are available and tentatively suitable for timber production. 32 acres are pure stands of aspen on slopes over 40 percent. These areas were added to analysis area 29 in the FORPLAN model.

98 acres of conifer require long span cable or aerial logging methods.

36 acres are non-forest. 25 acres are non-commercial forest land.

65 acres have regeneration problems that will require higher than normal costs to obtain adequate reforestation.

AA-706. Panguitch Lake Recreation Area. Has same characteristics as AA-6.

This analysis area contains 369 acres, all on Cedar City Ranger District.

37 acres are available and tentatively suitable for timber production, but require aerial logging methods. These acres also have regeneration problems.

220 acres are non-forest.

112 acres are non-commercial forest land.

AA-707. Panguitch Lake Recreation Area. Has same characteristics as AA-7. All 655 acres on Cedar City Ranger District.

AA-717. Brian Head Recreation Area. Has same characteristics as AA-17.

This analysis area contains 913 acres, all on Cedar City Ranger District.

121 acres are available and tentatively suitable for timber production, but require long span cable or aerial logging methods.

104 acres are non-forest.

202 acres are non-commercial forest land.

486 acres are not suitable for timber production because of potential irreversible resource damage.

AA-719. Panguitch Lake Recreation Area. Has same characteristics as AA-19.

This analysis area contains 208 acres, all on Cedar City Ranger District.

84 acres are available and tentatively suitable for timber production. 8 of these acres are pure aspen on slopes over 40 percent. 76 acres of mixed conifer require long span cable or aerial logging methods.

105 acres are non-forest.

19 acres are non-commercial forest land.

AA-724. Brian Head Recreation Area. Same characteristics as AA-24.

This analysis area contains 611 acres, all on Cedar City Ranger District.

75 acres are non-forest.

40 acres are non-commercial forest land.

496 acres are available and tentatively suitable for timber production. 198 of these acres are pure aspen stands on slopes over 40 percent. These areas are added to analysis area 29 in the FORPLAN model.

298 acres of mixed conifer are on slopes over 40 percent and require long span cable or aerial logging methods.

AA-736. Brian Head Recreation Area. Has same characteristics as AA-36. All 666 acres of this AA are non-forest and located on Cedar City Ranger District.

AA-738. Red Canyon Recreation Area. Has same characteristics as AA-38. This analysis area contains 172 acres of non-forest, all on Powell Ranger District.

AA-739. Red Canyon Recreation Area. Has similar characteristics to AA-39. This AA contains 565 acres, all of which are non-commercial forest land and all on Powell Ranger District.

AA-803. Red Canyon Area, Powell Ranger District. Has same characteristics as AA-3. This AA contains 659 acres that are available and tentatively suitable for timber production. 400 of these acres are on slopes less than 40 percent. 259 acres require long span cable or aerial logging methods.

AA-820. Red Canyon Area. Has same characteristics as AA-20. This analysis area contains 236 acres of non-forest, all on Powell Ranger District.

AA-821. Red Canyon Area. Has same characteristics as AA-21. This analysis area contains 466 acres of non-forest, all on Powell Ranger District.

AA-838. Red Canyon Area. Has same characteristics as AA-38. This analysis area contains 98 acres of non-forest, all on Powell Ranger District.

AA-839. Red Canyon Area. Has characteristics similar to AA-39. Of the 14,172 acres in this AA, 1138 acres are commercial forest land of which 638 are tentatively suitable for timber production. These acres all have regeneration problems that would require higher than normal costs to achieve adequate regeneration.

29 acres are non-forest.

13,005 acres are non-commercial forest land and 500 acres are unsuitable for timber production because of potential irreversible resource damage. 600 tentatively suitable acres are on slopes less than 40 percent. 38 acres require short span cable logging.

AA-902. Pine Valley Recreation Area. Has same characteristics as AA-2. This analysis area contains 222 acres of non-forest, all on Pine Valley Ranger District.

AA-903. Pine Valley Recreation Area. Has similar characteristics to AA-3. This AA contains 942 acres, all of which are available and tentatively suitable for timber production. These acres are on slopes less than 40 percent.

AA-947. Pine Valley Recreation Area. Has same characteristics as AA-47. This analysis area contains 2,546 acres, all on Pine Valley Ranger District. 2,296 acres are non-forest and 250 acres are non-commercial forest land.

3. Multiple Use Management Prescriptions

Multiple Use Management prescriptions represent a set of management practices or activities and their associated standards and guidelines. They are designed to produce a mix of outputs through time. Each prescription contains components of a production function for jointly produced outputs. Different analysis areas may utilize the same "prescription", however different output levels, costs, or benefits would occur due to inherent differences between analysis areas. Management prescriptions are commonly identified by two factors, Management Emphasis and Management Intensity, within the FORPLAN data file. Timing and scheduling options are defined as an integral part of each prescription.

The Forest developed 20 multiple use prescriptions in addition to a general Forest direction prescription. The multiple use prescriptions provide emphasis and intensity to certain activities whereas general Forest direction does not. In addition, four harvest emphases were prepared for use in FORPLAN modeling, which relate to the 20 multiple use management prescriptions. The FORPLAN prescription provide choices in timing and intensity, in addition to emphasis for timber management on suitable forest lands (see discussion under FORPLAN prescriptions which follows the description of the 20 multiple use prescriptions).

A summary description of the multiple use prescriptions follow:

MANAGEMENT PRESCRIPTION 1A
NATIONAL FOREST SYSTEM DEVELOPED RECREATION SITES

Management Prescription Direction

Management emphasis is for developed recreation in existing and proposed campgrounds, picnic grounds, trailheads, visitor information centers, summer home groups, and water-based support facilities. Proposed sites (sites scheduled for development in the plan) are managed to maintain the site attractiveness until they are developed.

Facilities such as roads, trails, toilets, signs, etc., may be dominant, but harmonize and blend with the natural setting. Livestock grazing is generally excluded from developed sites. Existing and proposed sites are withdrawn from locatable mineral entry.

MANAGEMENT PRESCRIPTION 1B
EXISTING AND PROPOSED WINTER SPORTS SITES

Management Prescription Direction

Management emphasis provides for downhill skiing on existing sites and maintains selected inventoried sites for future downhill skiing recreation opportunities. Management integrates ski area development and use with other resource management to provide healthy tree stands, vegetative diversity, forage production for wildlife and lifestock, and opportunities for nonmotorized recreation.

Visual resources are managed so that the character is one of forested areas interspersed with openings of varying widths and shapes. Facilities may dominate, but harmonize and blend with the natural setting. Harvest methods in forested areas between ski runs is clearcutting in aspen, shelterwood in ponderosa pine and mixed conifers, and group selection in Engelmann spruce-subalpine fir, or as specified in the permittee's site-specific development plan.

MANAGEMENT PRESCRIPTION 2A
SEMI-PRIMITIVE RECREATION OPPORTUNITIES IN A NATURAL APPEARING ENVIRONMENT

Management Prescription Direction

Management emphasis is for semi-primitive recreation opportunities. The semi-primitive management setting provides a special kind of outdoor experience, one dependent on a perception of remoteness.

Visual resources are managed so that management activities are not evident or remain visually subordinate. Past management activities such as historical changes caused by early mining, logging, and ranching may be present which are not visually subordinate, but appear to have evolved to their present state through natural processes. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.

Livestock distribution and stocking rates are managed to be compatible with recreation use.

The timber resource is managed using both commercial and noncommercial methods. Silvicultural prescriptions should be designed to maintain a visual quality objective of partial retention, enhance long-term visual quality, diversity, and provide for insect and disease control.

Mineral and energy resources activities are generally compatible with goals of this management prescription subject to appropriate stipulations provided in management activities G00 - G07 in Forest direction.

Local roads may be constructed for non-recreation purposes to a minimal standard compatible with a primitive environment and located so they will not detract from the objective. Once the activity is completed, the traffic will be controlled to whatever degree necessary to maintain the desired forest setting. This will continue until the road is again needed for more intensive management purposes.

MANAGEMENT PRESCRIPTION 2B
ROADED NATURAL AND RURAL RECREATION OPPORTUNITIES

Management Prescription Direction:

Management emphasis is for rural and roaded-natural recreation opportunities. Motorized and nonmotorized recreation activities such as driving for pleasure, viewing scenery, picnicking, fishing, snowmobiling, and cross-country skiing are possible. Conventional use of highway-type vehicles is provided for in design and construction of facilities. Motorized travel may be prohibited or restricted to designated routes, to protect physical and biological resources.

Visual resources are managed so that management activities maintain or improve the quality of recreation opportunities. Management activities are not evident, remain visually subordinate, or may be dominant, but harmonize and blend with the natural setting. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.

The harvest method by Forest cover type is clearcutting in aspen, shelterwood in ponderosa pine, mixed conifer and Engelmann spruce-subalpine fir.

MANAGEMENT PRESCRIPTION 4A
FISHERIES HABITAT IMPROVEMENT

Management Prescription Direction

The goals of management are to provide healthy, self-prepetuating plant communities, meet water quality standards, provide habitats for viable populations of wildlife and fish, and provide stable stream channels and still water body shorelines. The aquatic ecosystem may contain fisheries habitat improvement and channel stabilizing facilities that harmonize with the visual setting and maintain or improve wildlife or fish habitat.

Forest riparian ecosystems can be treated to improve wildlife and fish habitat diversity through specified silvicultural objectives. Timber harvest and other vegetation treatments are used to achieve multi-resource benefits while emphasizing riparian values.

Livestock grazing is at a level that will assure maintenance of the vigor and regeneration capacity of the riparian plant communities. Developed recreation and other construction of facilities is restricted or prohibited within the 100 year floodplain. Dispersed recreation will be managed to maintain ecological stability and visual objectives of the management area.

This management area will also be affected by other management activities in the Forest "General Direction". Most notable is the direction involving riparian area management, water resource improvement and maintenance, water uses management, and dam administration and maintenance.

MANAGEMENT PRESCRIPTION 4B
WILDLIFE HABITAT FOR MANAGEMENT INDICATOR, THREATENED, ENDANGERED, SENSITIVE AND/OR UNIQUE SPECIES

Management Prescription Direction

Management emphasis is on the habitat needs of one or more management indicator or other emphasized species. Species with compatible habitat needs are selected for an area. The goal is to optimize habitat capability, and thus numbers of the species. The prescription can be applied to emphasize groups of species, such as early succession dependent or late succession dependent, in order to increase species richness or diversity.

Vegetation characteristics and human activities are managed to provide optimum habitat for the selected species, or to meet population goals jointly agreed to with the state fish and wildlife agencies. Tree stands are managed for specific size, shape, interspersion, crown closure, age, structure, and edge contrast. Grass, forb, and browse vegetation characteristics are regulated. Rangeland vegetation is managed to provide needed vegetation species composition and interspersed grass, forb, and shrub sites or variety in age or browse plants. Fish habitat improvement treatments are applied to lakes and streams to enhance habitats and increase fish populations.

Recreation and other human activities are regulated to favor the needs of the designated species. Roaded-natural recreation opportunities are provided along Forest arterial and collector roads. Local roads and trails are either open or closed to public motorized travel. Semi-primitive motorized recreation opportunities are provided on those local roads and trails that remain open, semi-primitive nonmotorized opportunities are provided on those that are closed. A full range of tree harvest methods and rangeland vegetation treatment methods are available. Investments in other compatible resource uses may occur but will be secondary to wildlife habitat requirements. Management activities may dominate in foreground and middleground, but harmonize and blend with the natural setting.

MANAGEMENT PRESCRIPTION 4C
WILDLIFE HABITAT IN WOODY DRAWS AND OTHER WOODY VEGETATION AREAS ON RANGELANDS

Management Prescription Direction

Management emphasis is on wildlife habitat in hardwood and shrub-dominated draws and other areas of woody vegetation to sustain their inherent biological, physical, and visual values. Deciduous trees are regenerated. Diversity is achieved among individual sites of pinyon-juniper, gambel oak, cottonwood, mountain mahogany and other woody plant species. Vegetation characteristics on individual sites are diversified according to the wildlife goals for the site. Trees and shrubs are planted to supplement natural regeneration where needed. Woody cover in late seral stage is emphasized and is maintained adjacent to water. Direct habitat improvement projects occur.

Investments in compatible resources are made. Livestock grazing may occur, but is secondary to maintenance of desired woody plant characteristics. Management activities may dominate in foreground or middleground, but harmonize and blend in the natural setting. Recreational opportunities vary between semi-primitive nonmotorized and roaded natural.

MANAGEMENT PRESCRIPTION 4D
WILDLIFE HABITAT MANAGEMENT IN ASPEN

Management Prescription Direction

Management emphasis is on maintaining and improving aspen sites. Other tree species, if present, are de-emphasized. Aspen is managed to produce wildlife habitat, wood products, visual quality, and plant and animal diversity. Aspen clones are maintained. On larger areas, a variety of aspen stand ages, sizes, shapes, and interspersion are maintained. Both commercial and noncommercial treatments are applied. Even-aged management is practiced and is achieved by varying the size, age, shape, and interspersion of individual stands. Management activities in foreground and middleground are dominant, but harmonize and blend with the natural setting. Individual treatments generally are smaller than 40 acres.

Recreational opportunities available are semi-primitive nonmotorized and motorized or roaded natural. Some temporary or seasonal road and area use restrictions are implemented to prevent disturbance of wildlife or improve hunting and fishing quality.

Investments in other compatible resources occur. Livestock grazing can occur, but is subordinate to wildlife habitat needs and required protection of young aspen needed for regeneration.

MANAGEMENT PRESCRIPTION 5A
BIG-GAME WINTER RANGE IN NONFORESTED AREAS

Management Prescription Direction

Management emphasis is on winter range for deer, elk, and pronghorn. Treatments are applied to increase forage production of existing grass, forb, and browse species or to alter plant species composition. Prescribed burning, seeding, spraying, planting, and mechanical treatments may occur. Browse stands are regenerated to maintain a variety of age classes and species.

Investments in compatible resource activities occur. Livestock grazing is compatible, but is managed to favor wildlife habitat. Structural range improvements benefit wildlife. Management activities are not evident, remain visually subordinate, or are dominant in the foreground or middleground, but harmonize or blend with the natural setting.

New roads other than short-term (temporary) roads are located outside of the management area. Short term roads are obliterated within one season after intended use. Existing local roads are closed and new motorized recreation use is managed to prevent unacceptable stress on big game animals during the primary big game use season.

MANAGEMENT PRESCRIPTION 5B
BIG-GAME WINTER RANGE ON FORESTED AREAS

Management Prescription Direction

Management emphasis is on forage and cover on winter ranges. Winter habitat for deer, elk, is emphasized. Treatments to increase forage production or to create and maintain thermal and hiding cover for big game are applied. Tree stand treatments can be clearcut, shelterwood, single tree selection or group selection. Commercial and noncommercial stand treatments occur. Specific cover-opening ratios, and stand designs are maintained. Treatments to grass, forb, browse, and noncommercial tree species include seeding, planting, spraying, burning, falling and mechanical chopping or crushing. A variety of browse age classes are maintained. Continuous Forest cover is maintained on some sites.

Investments in compatible resources occur. Livestock grazing is compatible, but is managed to favor wildlife habitat. Structural range improvements benefit wildlife. Management activities are not evident, remain visually subordinate, or dominate in the foreground and middleground, but harmonize and blend with the natural setting.

New roads other than short-term temporary roads are located outside of the management area. Short term roads are obliterated within one season after intended use. Existing local roads are closed and new motorized recreation use is managed to prevent unacceptable stress on big game animals during the primary big game use season.

MANAGEMENT PRESCRIPTION 6A
EMPHASIS ON LIVESTOCK GRAZING

Management Prescription Direction

The area is managed for livestock grazing. Intensive grazing management systems are favored over extensive systems. Range condition is maintained through use of forage improvement practices, livestock management, and regulation of other resource activities. Periodic heavy forage utilization occurs. Investment in structural and nonstructural range improvements to increase forage utilization is moderate to high. Structural improvements benefit, or at least do not adversely affect wildlife. Conflicts between livestock and wildlife are resolved in favor of livestock. Nonstructural restoration and forage improvement practices available are seeding, planting, burning, fertilizing, pitting, furrowing, spraying, crushing, and plowing. Cutting of encroaching trees may also occur.

Investments are made in compatible resource activities. Dispersed recreational opportunities vary between semi-primitive nonmotorized and roaded natural. Management activities are evident but harmonize and blend with the natural setting.

MANAGEMENT PRESCRIPTION 7A
WOOD FIBER PRODUCTION AND UTILIZATION

Management Prescription Direction

Management emphasis is on wood-fiber production and utilization of large roundwood of a size and quality suitable for sawtimber. The harvest method by Forest cover type is clearcutting in aspen, and Engelmann spruce-subalpine fir, and shelterwood in ponderosa pine and mixed conifers.

The area generally will have a mosaic of fully stocked stands that follow natural patterns and avoid straight lines and geometric shapes. Management activities are not evident or remain visually subordinate along Forest arterial and collector roads and primary trails. In other portions of the area, management activities may dominate in foreground and middleground, but harmonize and blend with the natural setting.

Roaded-natural recreation opportunities are provided along Forest arterial and collector roads. Semi-primitive motorized recreation opportunities are provided on those local roads and trails that remain open, semi-primitive nonmotorized opportunities are provided on those that are closed.

MANAGEMENT PRESCRIPTION 8A
SEMI-PRIMITIVE WILDERNESS

Management Prescription Direction

Management emphasis is to provide for the protection and perpetuation of essentially natural bio-physical conditions. Solitude and low level of encounters with other users or evidence of past use is not an essential part of the social setting. Human travel is principally on system trails. Designated campsites are used and show evidence of repeated, but acceptable levels of use.

All resource management activities are integrated in such a way that current human use leaves only limited and site-specific evidence of their passing. Areas with evidence of unacceptable levels of past use are rehabilitated and the affected area restored. Range allotments with authorized permanent structures, and authorized mineral exploration activities requiring multi-year surface occupancy facilities may be present within the area. Scientific and other authorized practices utilizing nonmotorized equipment, but requiring up to season-long occupancy are compatible.

MANAGEMENT PRESCRIPTION 8A1
SEMI-PRIMITIVE WILDERNESS OPPORTUNITIES FOR
ANTONE BENCH AREA

Management Prescription Direction

Provide semi-primitive recreation opportunities requiring predominately unmodified natural settings, with a moderate to high degree of challenge and risk, while travelling cross-country or on trails. The provisions contained under Wilderness Area Management in General Forest Direction apply to the prescription except as they conflict with carbon dioxide exploration and development provisions of the Utah Wilderness Act. Exploration for carbon dioxide is permitted only by helicopter or other methods which do not involve road construction or other significant surface disturbance.

MANAGEMENT PRESCRIPTION 8A2

SEMI-PRIMITIVE WILDERNESS OPPORTUNITIES FOR EXCLUSION AREAS, BOX DEATH HOLLOW

Management Prescription Direction

Same as 8A1 except does not specify exploration methods.

MANAGEMENT PRESCRIPTION 9A

RIPARIAN AREAS

Management Prescription Direction

The goals of management are to provide healthy, self-perpetuating plant communities, meet water quality standards, provide habitats for viable populations of wildlife and fish, and provide stable stream channels and still water body shorelines. The aquatic ecosystem may contain fisheries habitat improvement and channel stabilizing facilities that harmonize with the visual setting and maintain or improve wildlife or fish habitat.

Forest riparian ecosystems are treated to improve wildlife and fish habitat diversity through specified silvicultural objectives. Timber harvest and other vegetation treatments are used to achieve multi-resource benefits emphasizing riparian values.

Livestock grazing is at a level that will assure maintenance of the vigor and regenerative capacity of the riparian plant communities. Developed recreation and other facility construction for overnight use is restricted or modified within the 100-year floodplain. Dispersed recreation will be managed to maintain ecological stability and visual objectives of the management area.

The management area over which this prescription is to be applied will also be affected by several management activities in the Forest-wide direction. Most notable is the direction involving riparian area management, upland zones, water uses management, water resource improvement and maintenance, and dam administration and maintenance.

MANAGEMENT PRESCRIPTION 9B

RIPARIAN AREAS - INTENSIVE MANAGEMENT

Management Prescription Direction

Management goals in this area are to enhance riparian ecosystems, improve water quality, improve wildlife and fish habitat, increase wildlife populations, and improve stream channel stability. Direction is generally the same as in Riparian Area Prescription 9A. However, management activities and particularly grazing, are more intensively managed to emphasize riparian area values.

MANAGEMENT PRESCRIPTION 10A
RESEARCH NATURAL AREAS

Management Prescription Direction

Emphasis is on research, study, observations, monitoring, and educational activities that are nondestructive and nonmanipulative, and that maintain unmodified conditions.

MANAGEMENT AREA 10B
MUNICIPAL WATER SUPPLY WATERSHED

Management Area Direction

Management emphasis is to protect or improve the quality and quantity of municipal water supplies. Management practices are modified.

FORPLAN Prescriptions

FORPLAN was used to model timber activities of Forest Planning alternatives on the Dixie National Forest. Management prescriptions provide choices of management emphases and intensities to the FORPLAN model, with each choice emphasizing an alternative method and investment level of managing Forest land and the production of a given set of outputs. Four management emphases or choices were provided in the Dixie FORPLAN model, a brief explanation of each is provided:

Table BII-1 displays acreage assignments for management prescriptions for each alternative.

FORPLAN LEVEL IDENTIFIERS
(Continued from Page BII-6)

LEVEL7	MGT	EMPH
TM	TIMBER	TIMBER EMPHASIS
02	RANGE	RANGE EMPHASIS
03	NOHAR	NO HARVEST
WV	WLVIS	WLDLF-VIS

1. Timber Emphasis. The timber emphasis provides for the maximization of wood fiber.

2. Range Emphasis. The range emphasis prescription maximizes the production of livestock forage on forested areas identified as tentatively available and suitable for timber production. The production of wood fiber is a secondary benefit under this prescription. The prescription is applied where the goal is to increase the amount of transitory range available on on the Forest. Only analysis areas where a fairly high potential for transitory range exists are assigned this prescription.

3. No Timber Harvest Emphasis. The prescription is applied to land areas where timber harvest is not compatible. In addition, areas not needed to meet the timber production goal of an alternative are assigned this prescription by the FORPLAN model.

TABLE BII-1
ACREAGE ASSIGNMENT BY MANAGEMENT AREA PRESCRIPTION FOR EACH ALTERNATIVE
(M Acres)

Mgmt. Area Presc.	Emphasis	Alternatives							
		A	B	C	D	E	F	G	H
1A	National Forest Recreation Sites.	17.4	19.4	14.7	17.4	4.6	5.0	11.2	13.7
1B	Existing winter sports sites.	3.8	3.8	3.3	3.8	2.2	3.8	3.4	3.7
2A	Semi-primitive recreation opportunities.	88.8	217.3	73.6	88.8	391.0	71.0	85.0	46.9
2B	Roaded natural & rural recreation opportunities. Maintained or improved visual quality on major travel routes.	114.5	135.5	15.6	114.5	224.8	20.9	14.1	0
4A	Fish habitat increase water quality & stream channel enhancement for fish habitat.	3.8	1.1	1.1	3.8	1.4	0.1	1.4	1.1
4B	Wildlife habitat management for one or more management indicator species. Livestock grazing will be compatible with wildlife habitat management.	14.3	149.9	0	14.3	444.5	0	15.5	0
4C	Wildlife habitat improvement. Vegetation treatment in hardwood and shrub dominated land. Livestock grazing will be compatible with wildlife habitat management.	0	72.9	0	0	0	0	0	0
4D	Wildlife habitat management. Livestock grazing will be compatible with wildlife habitat management. Clearcut aspen only.	0	10.5	0	0	45.0	0	4.1	0
5A	Big game winter range in non-forest areas. Travel management prevents unacceptable stress. Livestock grazing managed to favor wildlife habitat.	112.8	183.5	31.4	112.8	214.6	40.7	113.2	40.9

Mgmt. Area Presc.	Emphasis	Alternatives							
		A	B	C	D	E	F	G	H
5B	Big game winter range in forest areas. Travel management prevents unacceptable stress. Vegetation treatment will enhance plant and animal diversity. Livestock grazing managed to favor wildlife habitat.	0	4.5	0	0	0	0	0	0
6A	Livestock grazing. Improve forage composition. Vegetation treatment in mountain grass, meadow, and shrub; oakbrush; and aspen types.	339.9	281.6	465.6	339.9	57.9	939.4	480.0	848.8
7A	Intensive timber management. Timber harvest in aspen, spruce-fir, ponderosa pine and mixed conifer types. Slopes less than 40 percent.	271.2	270.4	200.4	271.2	130.4	373.7	305.4	590.8
8A	Semi-primitive wilderness setting. Moderate level of solitude. Moderate opportunity for challenge, risk, and self-reliance.	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0
8A1	Antone Bench Exclusion	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
8A2	Other Box-Death Hollow Exclusions.	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
9A	Riparian area management. Limits utilization of resources. One hundred feet from perennial stream edges, high water marks of lakes and wetlands.	17.6	8.6	1.1	17.6	6.4	.1	6.4	0
9B	Intensive riparian area management.	0	.6	0	0	6.1	0	0	0
10A	Research Natural Areas.	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
10B	Municipal Watersheds.	24.0	11.8	19.4	24.0	21.5	9.7	23.8	8.8
1.	General Forest Direction	786.6	423.3	968.5	786.6	244.3	330.3	731.2	240.0

TOTAL - 1,883.676 M ACRES

4. Wildlife and Visual Emphasis. The prescription is applied where visual quality or wildlife cover are emphasized. The emphasis limits timber production potential by extending the harvest rotation length. It allows regeneration to reach a desired height after a seed cut but before the overstory removal in a 2-step shelterwood pattern.

Each of the four management emphases are compatible with some, but not all of the multiple use prescriptions listed previously.

The multiple use prescriptions were applied to a Forest map by the Forest Planing Interdisciplinary Team and District personnel. Each alternative provides a set of multiple use prescriptions based on the goals and objectives of the alternative. FORPLAN emphases that are compatible with the multiple use prescriptions may be chosen by the FORPLAN model. The following table shows each multiple use prescription and the FORPLAN management emphases that are compatible.

TABLE BII-2

Prescription Number	Prescription Title	Compatible FORPLAN Emphases
--	General Forest Direction	No Harvest, Range, Timber, Wildlife/Visual
1A	Developed Recreation Areas	No Harvest
1B	Winter Sports Sites	No Harvest
2A	Semi-primitive Recreation Opportunity	No Harvest, Wildlife/Visual
2B	Rural and Roaded Natural Recreation Opportunity	No Harvest, Wildlife/Visual
4A	Fisheries Habitat Improvement	*
4B	Wildlife Habitat for Management Indicator, T&E Species	*
4C	Wildlife Habitat in Woody Draws	No Harvest, Wildlife/Visual
4D	Aspen Management for Wildlife	Timber
5A	Big-Game Winter Range on Non-Forest	*
5B	Big-Game Winter Range on Forest	No Harvest, Wildlife/Visual
6A	Intensive Livestock Grazing	Range

Prescription Number	Prescription Title	Compatible FORPLAN Emphases
7A	Wood Fiber Production and Utilization	Timber
8A, 8A1, 8A2	Wilderness Management	No Harvest
9A	Riparian Area Management	**
9B	Intensive Riparian Area Management	No Harvest
10A	Research Natural Areas	No Harvest
10B	Municipal Watersheds	No Harvest, Range, Timber, Wildlife/Visual

*Prescription doesn't affect a significant amount of available and suitable forest land.

**Treated as acreage reductions equivalent to volume reductions necessary to meet the requirements of the prescriptions.

Timber Harvest By Intensity

Within the timber and wildlife/visual emphasis prescriptions there are several investment levels or intensities from which the model may choose. A list of FORPLAN LEVEL 8 (Management Intensities) identifiers and a table displaying the intensities and their description, available to each analysis area by LEVEL 2 identifier follows:

FORPLAN LEVEL IDENTIFIERS
(Continued from page BII-6)

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*LEVEL8      MGTINTENSITY
  C1   PCFPCF   EXIST-PCT,CT,FH               :REGEN-PCT,CT,FH
  H1   OTFPCF   EXIST-OR,CT,PCT,FH            :REGEN-PCT,CT,FH
  H2   OTFPCA   EXIST-OR,CT,PCT,FH            :REGEN-PCT,CT,FHA
  H3   OTFPCB   EXIST-OR,CT,PCT,FH            :REGEN-PCT,CT,FHB
  H4   OTFP2F   EXIST-OR,CT,PCT,FH            :REGEN-PCT,2CT,FH
  H5   OTFP2A   EXIST-OR,CT,PCT,FH            :REGEN-PCT,2CT,FHA
  I1   OTAPCF   EXIST-OR,CT,PCT,FHA           :REGEN-PCT,CT,FH
  I2   OTAPCA   EXIST-OR,CT,PCT,FHA           :REGEN-PCT,CT,FHA
  I3   OTAP2F   EXIST-OR,CT,PCT,FHA           :REGEN-PCT,2CT,FH
  J1   OTBPCF   EXIST-OR,CT,PCT,FHB           :REGEN-PCT,CT,FH
  J2   OTBPCA   EXIST-OR,CT,PCT,FHB           :REGEN-PCT,CT,FHA
  J3   OTBP2F   EXIST-OR,CT,PCT,FHB           :REGEN-PCT,2CT,FH
  K1   OIFPCF   EXIST-OR,CT,PCT,CT,FH         :REGEN-PCT,CT,FH
  K2   OIFPCA   EXIST-OR,CT,PCT,CT,FH         :REGEN-PCT,CT,FHA
  K3   OIFP2F   EXIST-OR,CT,PCT,CT,FH         :REGEN-PCT,2CT,FH
  K4   OIFP2A   EXIST-OR,CT,PCT,CT,FH         :REGEN-PCT,2CT,FHA
  L1   OIAPCF   EXIST-OR,CT,PCT,CT,FHA        :REGEN-PCT,CT,FH
  L2   OIAP2F   EXIST-OR,CT,PCT,CT,FHA        :REGEN-PCT,2CT,FH
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TABLE BII-3
MANAGEMENT INTENSITIES AVAILABLE TO FORPLAN

Level 2 Identifier	Management Intensity	Beginning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
01,08,6A (Simulated as a two story stand)	OIFPCF OIFP2F OIFP2A	90	Existing	90-130/Overstory removal w/commercial thin & precommercial thin	110-150/Commercial thin	120-180/Shelterwood	
	OIFPCF		Regenerated	35-45/Precommercial thin	75-85/Commercial thin	125-135/Shelterwood	
	OIFP2F		Regenerated	35-45/Precommercial thin	75-85/Commercial thin	95-105/Commercial thin	125-135/Shelterwood
	OIFP2A		Regenerated	Same as OIFP2F with different density management assumptions.			
	OFH-FH, OFHPFH, OFHPCF OFHP2F, OFHP2A		Existing	90-130/Overstory Removal	120-180/Shelterwood		
	OFH-FH		Regenerated	125-135 Shelterwood			
	OFHPFH		Regenerated	45/Precommercial	125-135/Shelterwood		
	OFHPCF		Regenerated	Same as OIFPCF.			
	OFHP2F		Regenerated	45/Precommercial thin	75/Commercial thin	105/Commercial thin	125-135/Shelterwood
	OFHP2A		Regenerated	Same as OFHP2F with different density management assumptions.			
19,35,51,60,7E 54,6F,GH (Simulated as a two story stand)	OIFPCF OIFPCA OIFP2F OIFP2A	90	Existing	90-130/Overstory removal w/commercial & precommercial thin	110-150/Commercial thin	120-180/Shelterwood	
	OIFPCF		Regenerated	45/Precommercial thin	85/Commercial thin	135-145/Shelterwood	
	OIFPCA		Regenerated	45/Precommercial thin	95/Commercial thin	135-145/Shelterwood	
	OIFP2F		Regenerated	45/Precommercial thin	85/Commercial thin	115/Commercial thin	135-145/Shelterwood
	OIFP2A		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	135-145/Shelterwood
	OFH-FH, OFHPFH, OFHPCF OFHPCA, OFHP2A, OFHP2A		Existing	90-130/Overstory Removal	120-180/Shelterwood		

Level 2 Identifier	Management Intensity	Beginning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
	OFH-FH		Regenerated	135-145/Shelterwood			
	OFHPFH		Regenerated	45/Precommercial thin	135-145/Shelterwood		
	OFHPCF		Regenerated	45/Precommercial thin	85/Commercial thin	135-145/Shelterwood	
	OFHPCA		Regenerated	45/Precommercial thin	95/Commercial thin	135-145/Shelterwood	
	OFHP2F		Regenerated	45/Precommercial thin	85/Commercial thin	115/Commercial thin	135-145/Shelterwood
	OFHP2A		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	135-145/Shelterwood
03,2A,5A,6B,7A, 8A,9A (Simulated as a two story stand)	OTFPCF OTFPCA OTFPCB OTFP2F OTFP2A	65	Existing	65-105/Overstory removal w/precommercial & commercial thin.	125-185/Shelterwood		
	OTFPCF		Regenerated	25-45/Precommercial thin.	85/Commercial thin	125-135/Shelterwood	
	OTFPCA		Regenerated	45/Precommercial thin	95/Commercial thin	125-135/Shelterwood	
	OTFPCB		Regenerated	45/Precommercial thin	95/Commercial thin	125/135/Shelterwood	
	OTFP2F		Regenerated	45/Precommercial thin	85/Commerical thin	105/Commercial thin	125-135/Shelterwood
	OTFP2A		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	125-135/Shelterwood
	OFH-FH OFHP-FH OFHPCF OFHPCA OFHP2F OFHP2A		Existing	65-105/Overstory Removal	125-185/Shelterwood		
	OFH-FH		Regenerated	125-135/Shelterwood			

Level 2 Identifier	Management Intensity	Beginning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
	OFHPFH		Regenerated	45/Precommercial thin	125-135/Shelterwood		
	OFHPCF		Regenerated	25/Precommercial thin	85/Commercial thin	125-135/Shelterwood	
	OFHPCA		Regenerated	45/Precommercial thin	95/Commercial thin	125-135/Shelterwood	
	OFHPCFB		Regenerated	Same as OFHPCA with different density Management assumptions.			
	OFHP2F		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	135-145/Shelterwood
	OFHP2A		Regenerated	45/Precommercial thin	85/Commercial thin	115/Commercial thin	135-145/Shelterwood
05, 7B	OTFPCF		80	Existing	80-110/Overstory Removal with Commercial thin and Precommercial thin	160-220/Shelterwood	
	OTFPCF		Regenerated	45/Precommercial thin	95/Commercial thin	125-135/Shelterwood	
	OFH-FH FHPFH OFHPCF		Existing	80-110/Overstory Removal	120-180/Shelterwood		
	OFH-FH		Regenerated	125-135/Shelterwood			
	OFHPFH		Regenerated	45/Precommercial thin	125-135/Shelterwood		
	OFHPCF		Regenerated	45/Precommercial thin	95/Commercial thin	125-135/Shelterwood	
06, 39, 8B, 5B 6E, 6G, 7C (simulated as a two story stand)	OFH-FH OFHPFH OFHPCH	90	Existing	90-130/Overstory Removal	120-180/Shelterwood		
	OFH-FH		Regenerated	125-135/Shelterwood			
	OFHPFH		Regenerated	45/Precommercial thin	125-135/Shelterwood		

Level 2 Identifier	Management Intensity	Beginning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
	OFHPCF		Regenerated	45/Precommercial thin	95/Commercial	125-135/Shelterwood	
13, 41, 63, 71 (simulated as a two story stand)	OTFPCF OTFPCA OTFP2F	100	Existing	100-140/Overstory Removal with Commercial thin and Precommercial thin	130-240/(Small clearcut)		
	OTFPCF		Regenerated	55/Precommercial thin	105/Commercial thin	135-145/Shelterwood	
	OTFPCA		Regenerated	Same as OFTFPCF with different density management assumptions.			
	OTFP2F		Regenerated	55/Precommercial thin	105/Commercial thin	125/Commercial thin	135-145/Shelterwood
	OTAPCF OTAPCA OTAP2F		Existing	Same as OFTPCF with different densitity management assumptions.			
	OTAPCF		Regenerated	Same as OTFPCF			
	OTAPCA		Regenerated	Same as OTFPCA			
	OTAP2F		Regenerated	Same as OTFP2F			
	OTBPCF OTBPCA OTBP2F		Existing	Same as OTAPCF with different density management assumptions			
	OTBPCF		Regenerated	Same as OTFPCF			
	OTBPCA		Regenerated	Same as OTFPCA			
	OTBP2F		Regenerated	Same as OTFP2F			
	OFH-FH OFHPFH OFHPCF OFHPCA OFHP2F		Existing	100-140/Overstory Removal	130-240/Clearcut		
	OFH-FH		Regenerated	135-145/Shelterwood			
	OFHPFH		Regenerated	55/Precommercial thin	135-145/Shelterwood		

Level 2 Identifier	Management Intensity	Beginning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
	OFHPCF		Regenerated	55/Precommercial thin	105/Commercial thin	135-145/Shelterwood	
	OFHPCA		Regenerated	Same as OFHPCF with different density management assumptions			
	OFHP2F		Regenerated	55/Precommercial thin	105/Commercial thin	125/Commercial thin	135-145/Shelterwood
17, 55, 3A, 7D (simulated as two story stand)	OIFPCF OIFPCA OIFP2F OIFP2A	90	Existing	90-130/Overstory Removal with Commercial thin and Precommercial thin	140-170/Commercial thin	170-230/Shelterwood	
	OIFPCF		Regenerated	45/Precommercial thin	95/Commercial thin	135-145/Shelterwood	
	OIFPCA		Regenerated	45/Precommercial thin	85/Commercial thin	135-145/Shelterwood	
	OIFP2F		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	135-145/Shelterwood
	OIFP2A		Regenerated	45/Precommercial thin	85/Commercial thin	115/Commercial thin	135-145/Shelterwood
	OFHP2F OFH-FH OFHPFH OFHPCF OFHPCA		Existing	90-130/Overstory Removal	130-190/Shelterwood		
	OFH-FH		Regenerated	140-150/Shelterwood			
	OFHPFH		Regenerated	45/Precommercial thin	140-150/Shelterwood		
	OFHPCF		Regenerated	45/Precommercial thin	85/Commercial thin	140-150/Shelterwood	
	OFHPCA		Regenerated	45/Precommercial thin	95/Commercial thin	140-150/Shelterwood	
	OFHP2F		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	140-150/Shelterwood
	OFHP2A		Regenerated	45/Precommercial thin	85/Commercial thin	115/Commercial thin	140-150/Shelterwood

Level 2 Identifier	Management Intensity	Beginning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
23, 24, 25, 6C 6D, 7F (simulated as two story stand)	PIFPCF OIFPCA OIFPZF OIFP2A	105	Existing	105-145/Overstory Removal with Commercial Thin and Precommercial Thin	145-175/	165-225/	
	OIFPCF		Regenerated	45/Precommercial thin	85/Commercial thin	135-145/Shelterwood	
	OIFPCA		Regenerated	45/Precommercial thin	95/Commercial thin	135-145/Shelterwood	
	OIFP2F		Regenerated	45/Precommercial thin	85/Commercial thin	115/Commercial thin	135-145/Shelterwood
	OIFP2A		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	135-145/Shelterwood
	OFH-FH OFHPFH OFHPCF OFHPCA OFHP2F OFHP2A		Existing	105-145/Overstory Removal	135-195/Shelterwood		
	OFH-FH		Regenerated	135-145/Shelterwood			
	OFHPFH		Regenerated	45/Precommercial thin	135-145/Shelterwood		
	OFHPCF		Regenerated	45/Precommercial thin	85/Commercial thin	135-145/Shelterwood	
	OFHPCA		Regenerated	45/Precommercial thin	95/Commercial thin	135-145/Shelterwood	
	OFHP2F		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	135-145/Shelterwood
	OFHP2A			45/Precommercial thin	85/Commercial thin	115/Commercial thin	135-145/Shelterwood
31, 3B, 36 (simulated as a two story stand)	OTFPCF OTFPCA OTFP2F	90	Existing	90-120/Overstory Removal with Commercial thin and Precommercial thin	130-260/(Small clearcut)		
	OTFPCF		Regenerated	55/Precommercial thin	105/Commercial thin	135-145/Shelterwood	

Level 2 Identifier	Management Intensity	Beginning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
	OTFPCA		Regenerated	Same as OTFPCF with different density management assumptions.			
	OTFP2F		Regenerated	55/Precommercial thin	105/Commercial thin	125/Commercial thin	135-145/Shelterwood
	OTAPCF OTAPCA OTAP2F		Existing	Same as OTFPCF with Different density management assumptions.			
	OTAPCF		Regenerated	Same as OTFPCF			
	OTAPCA		Regenerated	Same as OTFPCA			
	OTAP2I		Regenerated	Same as OTFP2F			
	OTBPCF OTBPCA OTBP2F		Existing	Same as OTAPCF with different density management assumptions			
	OTBPCF		Regenerated	Same as OTFPCF			
	OTBPCA		Regenerated	Same as OTFPCA			
	OTBP2F		Regenerated	Same as OTFP2F			
	OFH-FH OFHPFH OFHPCF OFHPCA OFHP2F		Existing	90-120/Overstory Removal	130-260/(Small clearcut)		
	OFH-FH		Regenerated	135-145/Shelterwood			
	OFHPFH		Regenerated	55/Precommercial thin	135-145/Shelterwood		
	OFHPCF		Regenerated	55/Precommercial thin	105/Commercial thin	135-145/Shelterwood	
	OFHPCA		Regenerated	Same as OFHPCF with different density management assumptions			
	OFHP2F		Regenerated	55/Precommercial thin	105/Commercial thin	125/Commercial thin	135-145/Shelterwood
70 (simulated as a two story stand)	OIFPCF OIFP2F OIFP2A OIAPCF OIAP2F OIAP2A	95	Existing	95-135/Overstory Removal with commercial thin and Precommercial thin	135-175/Commercial thin	200-260/Shelterwood	

Level 2 Identifier	Management Intensity	Beginning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
	OIFPCF		Regenerated	35-45/Precommercial thin	75-85/Commercial thin	125-135/Shelterwood thin	
	OIFP2F		Regenerated	45/Precommercial thin	75/Commercial thin	95/Commercial thin	125-135/Shelterwood
	OIFP2A		Regenerated	45/Precommercial thin	75/Commercial thin	105/Commercial thin	125-135/Shelterwood
	OIAPCF		Regenerated	45/Precommercial thin	75/Commercial thin	125-135 Shelterwood	
	OIAP2F		Regenerated	Same as OIFP2F with different density management assumptions			
	OIAP2A		Regenerated	Same as OIFP2A with different density management assumptions			
	OFH-FH OFHPFH OFHPCF OFHP2F OFHP2A		Existing	95-135/Overstory Removal	125-185/Shelterwood		
	OFH-FH		Regenerated	125-135/Shelterwood			
	OFHPFH		Regenerated	45/Precommercial Thin	125-135/Shelterwood		
	OFHPCF		Regenerated	45/Precommercial thin	75/Commercial thin	125-135/Shelterwood	
	OFHP2F		Regenerated	45/Precommercial thin	75/Commercial thin	95/Commercial thin	125-135 Shelterwood
	OFHP2A		Regenerated	45/Precommercial thin	75/Commercial thin	105/Commercial thin	125-135/Shelterwood
29	FH--FH	80	Existing	80-140/Clearcut			
	FH--FH		Regenerated	105-155/Clearcut			
72	FH-FH	25	Existing and Regenerated	105-155/Clearcut			
57, 2B	FHPCA FH--FH FH-PCF FH-P2F FH-P2A	110	Existing	100-200/Clearcut			

Level 2 Identifier	Management Intensity	Begin-ning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
	FH--FH		Regenerated	135-145 Shelterwood			
	FH-PCF		Regenerated	45/Precommercial thin	85/Commercial thin	135-145/Shelterwood	
	FH-P2F		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	135-145/Shelterwood
	FH-P2A		Regenerated	45/Precommercial thin	85/Commercial thin	115/Commercial thin	135-145/Shelterwood
	FHPCA		Regenerated	45/Precommercial thin	95/Commercial thin	135-145/Shelterwood	
73	FH--FH FH-PFH FH-P2A FH-PCF	105	Existing	105-205/Clearcut			
	FH--FH		Regenerated	125-135/Shelterwood			
	FH-PFH		Regenerated	45/Precommercial thin	125-135/Shelterwood		
	FH-P2F		Regenerated	45/Precommercial thin	95/Commercial thin	115/Commercial thin	125-135/Shelterwood
	FH-P2A		Regenerated	45/Precommercial thin	85/Commercial thin	115/Commercial thin	125-135/Shelterwood
	FH-PCF		Regenerated	45/Precommercial thin	75/Commercial thin	125-135/Shelterwood	
74	FH-FH FH-PFH	15	Existing	125-185/Shelterwood			
			Regenerated	125/135/Shelterwood			
	FH-PFH		Regenerated	45/Precommercial thin	75/Commercial thin	125-135/Shelterwood	
	PCF-PCF		Existing	35-45/Pre-commercial thin	75-85/Commercial thin	125-185/Shelterwood	
	PCF-PCF		Regenerated	Same as PCFPCF			
75		0	Existing and Regenerated	Same as Level 2, 74			

Level 2 Identifier	Management Intensity	Beginning Age	Existing/ Regenerated Stand	1st Entry Age/ Harvest Type	2nd Entry Age/ Harvest Type	3rd Entry Age/ Harvest Type	4th Entry Age/ Harvest Type
76	FH--FH FH-PFH	15	Existing	135-195/Shelterwood			
	FH-FH		Regenerated	135=145/Shelterwood			
	FH-PFH		Regenerated	55/Precommercial thin	105/Commercial thin	135-145/Shelterwood	
	PCFPCF		Existing	Same as FH-PFH (Regenerated)			
	PCFPCF		Regenerated	Same as PCFPCF (Existing)			
77		0	Existing and Regenerated	Same as Level 2, 76			
78	FH--FH FH-PFH	15	Existing	125-185/Shelterwood			
	FH--FH		Regenerated	125-135/Shelterwood			
	FH-PFH		Regenerated	25/Precommercial thin	85/Commercial thin	125-135/Shelterwood	
	PCFPCF		Existing	25-45/Precommercial thin	85-95/Commercial thin	125-185/Shelterwood	
	PCFPCF		Regenerated	Same as PCFPCF			
79		0	Existing and	Same as Level 2, 78			

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*LEVEL8        MGTINTENSITY
  L3     OIAP2A    EXIST-OR,CT,PCT,CT,FHA          :REGEN-PCT,2CT,FHA
  M1     OFH-FH    EXIST-OR,FH                     :REGEN-FH
  M2     OFHPFH    EXIST-OR,FH                     :REGEN-PCT,FH
  M3     OFHPCF    EXIST-OR,FH                     :REGEN-PCT,CT,FH
  M4     OFHPCA    EXIST-OR,FH                     :REGEN-PCT,CT,FHA
  M5     OFHPCB    EXIST-OR,FH                     :REGEN-PCT,CT,FHB
  M6     OFHP2F    EXIST-OR,FH                     :REGEN-PCT,2CT,FH
  M7     OFHP2A    EXIST-OR,FH                     :REGEN-PCT,2CT,FHA
  N1     FH--FH    EXIST-FH                        :REGEN-FH
  N2     FH-PFH    EXIST-FH                        :REGEN-PCT,FH
  N3     FH-PCF    EXIST-FH                        :REGEN-PCT,CT,FH
  N4     FH-PCA    EXIST-FH                        :REGEN-PCT,CT,FHA
  N5     FH-P2F    EXIST-FH                        :REGEN-PCT,2CT,FH
  N6     FH-P2A    EXIST-FH                        :REGEN-PCT,2CT,FHA
  01     NOHNOH    EXIST-NO HARVEST                :REGEN-NO HARVEST
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Activities

Activities represent active or passive management of the land. Further, activities incur costs; hence, represent choices for the use of capital outlays. Activities may be specific, such as: a 2 - step shelterwood pattern on an acre of ponderosa pine sawtimer. Alternatively, activities may be general, such as: "general administrative expense of the Forest under Alternative X. General activities were treated outside the FORPLAN model. Associated with each activity or set of activities is a set of standards and guidelines. Table BII-3a lists activities modeled outside of FORPLAN and Table BII-3b lists activities treated in the FORPLAN model. Cost assumptions developed for all activities are discussed in detail in Chapter II-E of this Appendix.

TABLE BII-3a
NON-FORPLAN ACTIVITIES

MIH CODE	DESCRIPTION	UNIT OF MEASURE
A05	Facility and Site Reconstruction	PAOT
A06	Facility and Site Construction	PAOT
A07	Facility and Site Management	PAOT days
A08	Use Administration	PAOT days
A11	Trail Construction	Miles
A12	Trail Maintenance	Miles
B03	Wilderness Use Administration	PAOT days
C02	Non-Structural Habitat Improvement	Acres
C03	Structural Habitat Improvement	Structure
C04	Structural Habitat Maintenance	Structure
D03	Range Non-Structural Improvement	Acres
D04	Non-Structural Improvement Maintenance	Acres
D05	Range Structural Improvement - New	Structures
D06	Range Structural Improvement Maintenance	Structures
D07	Range Administration and Management	Cases
F03	Improvement	Acres
F04	Administration/Management	Plans
G03	Processing of Exploration Proposals	Cases
G04	Processing of Lease Applications	Leases
G05	Processing of Site Development Proposals	Plans
G06	Administration of Operation	Plans
J01	Special Use Management	Cases
J03	FERC Licenses and Permits	Application
J06	Proposed Boundary Location	Miles
J13	Land Exchange	Acres
J18	Rights-of-Way Acquisition	Cases
L05	Arterial Road Reconstruction	Miles
L08	Collector Road Construction	Miles
L09	Collector Road Reconstruction	Miles
L19	Road Operation	Miles
L25	FA&O Facility Maintenance	Dollars
T01	Line Management	Dollars
T02	Program Support	Dollars
T03	Common Service	Dollars

TABLE BII-3b
ACTIVITIES INCLUDED IN FORPLAN*

MIH CODE	DESCRIPTION
AZ9	Resource Coordination
CZ9	Wildlife Coordination
E00	Timber Planning
E03	Silviculture Exam and Prescription
E04	Reforestation
E05	Timber Stand Improvement
E06	Timber Sale Preparation
E07	Timber Sale Administration
FZ9	Resource Coordination (Soil, Water, Air)
F03	Resource Improvement
	Brush Disposal
P24	Law Enforcement
U01	Program Planning and Administration
J06	Boundary Location
L01	Transportation Planning and Inventory
L15	Preconstruction Engineering
L45	Road Maintenance
	Purchaser Road Construction

*All costs entered in the FORPLAN model on a per acre basis

Outputs and Environmental Effects

Outputs and environmental effects result from the activities modeled. Generally, as more money is applied to the activity set, more outputs are produced from the land. However, qualitative criteria are also included in the model; hence, there may be exceptions to the above generalization. Outputs may be priced directly in the model or may be included without prices where estimation of prices is not practical. Environmental effects included in the model represent quality differentials and will typically be represented through the use of constraints. Table BII-3c lists outputs and environmental effects modeled outside of FORPLAN and Table BII-3d lists outputs and environmental effects treated in the FORPLAN model. Pricing assumptions for priced outputs are discussed in detail beginning on page BII-102 of this Appendix.

READEX FICHE

TABLE BII-3C
NON-FORPLAN OUTPUTS

MIH CODE	DESCRIPTION
W01	Primitive Recreation Use
W03	Semi-Primitive Non-Motorized Recreation Use
W05	Semi-Primitive Motorized Recreation Use
W07	Roaded Natural Recreation Use
W09	Rural Recreation Use
W11	Urban Recreation Use
W30	Wilderness Use
W41	Big Game User Days
W48	Non-Game User Days
WW7	Fish User Days
WW8	Wildlife User Days (small game)
W66	Grazing Capacity
X07	Softwood Roundwood Production
X08	Softwood Personal Use Firewood Production
X10	Hardwood Roundwood Timber Production
X11	Hardwood Personal Use Firewood Production
X80	Increased Water Yield-Colorado River
X80	Increased Water Yield-Great Basin
Y01	Locatable Mineral Commodities Produced
Y02	Mineral Materials Sold
Y03	Mineral Material Free Use
Y04	Mineral Materials-In Service Use
Y05	Leasable Minerals-Non-Energy
Y06	Reserved Non-Energy Mineral Production
Y07	Reserved Energy Mineral Production
Y10	Oil and Gas Production
Y11	Coal Production
Y13	Uranium Production
Y15	Lease Rentals-Energy

Table BII-3d
FORPLAN OUTPUTS

MIH CODE	DESCRIPTION
X06	Softwood Sawtimber Production
X09	Hardwood Sawtimber Production
X80	Increased Water Yield-East Fork Sevier River

4. Constraints

Constraints are used to ensure that the assignment of prescriptions to analysis areas conforms to the emphasis of a particular alternative. FORPLAN constraints fall into four categories: 1) constraints for technical implementability, 2) constraints to ensure conformance to the minimum management requirements, 3) general timber policy constraints; i.e., nondeclining yield and harvest of timber stands generated at or beyond culmination of mean annual increment, and 4) discretionary constraints designed to achieve various levels of outputs and expenditure levels. The first three categories of constraints define production limits common to most alternatives (exceptions include "departure alternatives"). The fourth category completes the specification of the production surface for a particular alternative. Specification of the production surface and an objective function are sufficient conditions for the FORPLAN model to achieve an efficient assignment of prescriptions to analysis areas. Chapter VI of this appendix displays constraints and the rationale for their use.

5. Objective Function

The objective function guides the linear programming algorithm to an optimal solution. In Forest planning alternatives, the objective function is "maximize present net value" of all priced outputs. In the Dixie National Forest FORPLAN model this includes softwood and hardwood sawtimber. Because little sawtimber was harvested in the "Maximize Present Net Value" benchmark, the objective function became "maximize sawtimber production (MCF) in the first decade" in all alternatives where a harvest floor was not provided. The run was then "rolled over"to maximize present net value. "Rolled over" means that the alternative modeled was constrained to the same level of sawtimber outputs resulting from the "maximize sawtimber 1st decade run", then rerun maximizing present net value to achieve the most efficient solution for those output levels.

Priced outputs other than timber, non-priced outputs, and qualitative environmental effects are portrayed in FORPLAN with specific constraint sets dependent on alternative objectives. Since constraints must always be satisfied, the objective function will never locate optimal solutions outside the scope of the constraints specified for outputs and environmental effects (whether or not they are priced). For this reason, it is desirable to consider marginal changes in solutions as constraint sets are adjusted. This "sensitivity analysis" is quite expensive, given the scope of the Forest Planning problem, and was performed only where a major issue or concern suggests that the benefits of additional analysis outweighed the cost of the analysis. Chapter III describes objective functions used with each benchmark, Chapter VI the objective function used with each alternative.

B. Socioeconomic and Social Impact Analysis Methodology

1. General Description

Forest Service land management activities affect the local and regional economy in two ways. First, the Forest Service purchases goods and services from the local or regional economy in order to manage the National Forest. In addition, the flow of forest resource outputs influences economic activities.

Regulations of the National Forest Management Act and the National Environmental Policy Act require the Forest Service to consider economic efficiency and economic effects in the formulation, evaluation, and selection of Forest planning alternatives. As a result, the Forest Service has developed a computer-based economic model referred to as IMPLAN.

IMPLAN uses input-output analysis to analyze the interdependencies among the industries of a regional economy. Industries must purchase inputs from other industries in order to produce outputs that are sold either to other industries or to final consumers. In input-output analysis, these flows of inputs and outputs are traced to show the linkages between the industries composing an economy. This information is valuable in Forest planning as it can be used to portray the Forest's relationship to the area economy. Different management alternatives can be evaluated in terms of their impact on employment, income, and population levels.

The Input-Output (I/O) technique has a long tradition as a means of estimating economic impacts. The discussion here makes no pretense of being either original or comprehensive. It is intended as a brief but accurate description of the technique as it is utilized in Forest planning.

An I/O model initially depicts the sales and purchase detail of an economy for a particular year (the base year). Because the sales of one sector* are the purchases of other sectors, an accounting identity or equality exists for the base year. The IMPLAN system permits construction of an economy composed of any collection of counties the user wishes to model. The IMPLAN base year is 1977.

Given the base year equality of sector sales and purchases, the I/O technique permits the analyst to address the following question: What would the various sector sales look like if some sectors had produced at levels other than they actually did? For example, what would the base year output of the logging sector have been if the sawmill sector had produced twice as much lumber as it actually did in the base year? An I/O model assembled for the economy at issue would provide the sales response of the logging sector in the economy. This is the essence of the I/O technique for impact assessment. It estimates what the economy would have looked like in the base year if some outputs had been other than they actually were.

In the context of Forest planning, alternate land management actions are modeled to determine the corresponding impacts to local employment, income, and population. The first step is to describe the potential management action as a change from the situation that existed in 1977. This change is then translated from Forest Service outputs to a change in the sales of affected industries. The model considers these "direct" industry changes and calculates the all-industry indirect and induced sales changes. These are then converted by the model into employment, income, and population changes.

Strictly speaking, the foregoing exercise indicates the level of economic activity that would have been obtained in the multi-county economy in 1977 if the Forest Service had operated at levels equal to those of the modeled management action in 1977. In practice, the changes in economic activity indicated by the exercise are utilized as predictions of future economic impacts.

*A sector may be an industry (sawmills, livestock, etc.) a group of industries (manufacturing, services, etc.), or some economic category such as the households sector, the government sector, etc.

The data base for the IMPLAN model consists of two major parts: (1) a national level technology matrix and (2) estimates of sectorial (466 sectors) activity for final demand, final payments, gross output, and employment on a county by county basis.

The national technology matrix denotes sectorial production functions which are used to estimate local purchases and sales. This matrix is based on a 1972 Commerce Department 110 model converted to an industry by industry basis and updated to 1977 by relative price changes and RAS procedure.

1977 estimates of the 466 industrial sectors on a state and county level was developed by Engineering Economics Associates of Berkeley, California.

By using the national technology matrix and the estimates of sectorial activities on a county by county basis, more localized production functions are developed to estimate local purchases and sales.

Modeling the Dixie Forest Zone of Influence

An assessment was made of the role played by the Dixie National Forest in the regional economy within which it is located. Based on an analysis of the recreation, timber, and grazing outputs of the Forest, it was determined that two Input-Output models should be assembled. The first model encompasses the corridor of the economically connected communities in and about Interstate 15 from Parowan through St. George. This model was assembled from data covering Iron and Washington Counties, Utah, and provides a means for determining the sensitivity of the corridor and surrounding economy to changes in Forest outputs from the Pine Valley Ranger District and the west side of the Cedar City Ranger District. Two adjustments to the base data were made for the two counties. First, in Washington County the Data was adjusted for a decrease in petroleum production. Second, in Iron County the data was adjusted for the recent closing of the iron mines.

The second model is made up from data for Piute, Garfield, Wayne, and Kane Counties, Utah. This model was used to establish the Forest-local economy links for the east side of the Cedar City Ranger District and the Escalante, Teasdale, and Powell Districts. These subunits of the Dixie National Forest contribute to the economic health of the essentially rural communities that are located in the vicinity.

2. Area of Impact

The Dixie National Forest must be responsive to legal and agency requirements, National and Regional trends and demands, local issues, and management concerns. To help meet this objective, three zones of influence (ZOI) have been established. The local ZOI consists of those counties directly impacted by Forest actions. A Regional and National ZOI discussion, although not discussed here, provide information on broad Regional and National trends, and resource supply and demand as it relates to the Dixie NF.

The local zone of influence, covers the counties of Piute, Garfield, Wayne, Kane, Iron, and Washington. Dixie National Forest lands also lie within these same counties.

The counties of Wayne, Garfield, and Piute are more dependent on National Forest resources as the majority of persons in the farming-ranching business also have some livestock which is permitted on National Forest lands. Also, this same farmer-rancher will obtain some National Forest products to enhance his/her operation with posts, poles, some logs for needed lumber, firewood, sand, gravel, and Christmas trees.

The following shows total acres and population of each county and acres of National Forest land within each county:

TABLE BII-4

County	Total Acres 1/	Net NF Acres	1980 Population
Piute	482,560	2,080	1,329
Garfield	3,318,400	1,042,041	3,673
Wayne	1,591,040	79,576	1,911
Kane	2,570,240	124,439	4,024
Iron	2,112,000	241,194	17,349
Washington	1,553,280	394,572	26,065

Sources: 1. Utah Agricultural Statistics 1980.
2. U.S. Bureau of the Census, 1980 census of population and housing.

Units of Analysis

The zone of influence is too large, and the people living in it too different from each other, to attempt to describe it as one homogeneous area; so the ZOI is broken up into units of analysis. A second series of units is used to display some like characteristics in terms of people's relation to the Forests and their prevalent values and attitudes. Information used to describe these units was gathered by interviewing one or more Forest Service employees, local people, and/or community officials. These descriptions are very general and will not apply to all members of the community, and should not be interpreted as such. The units and the counties in which they are located are:

		County (ies) where Located
1.	Cedar City/Parowan	Iron, Kane
2.	Teasdale	Wayne
3.	Escalante/Boulder	Garfield
4.	Henrieville/Tropic/Cannonville	Garfield
5.	Antimony/Circleville/Kingston	Garfield, Piute
6.	John's Valley	Garfield
7.	Panguitch	Garfield
8.	St. George Environs	Washington
9.	Enterprise/Newcastle/Beryl	Washington, Iron

Employment, Income, Government Revenues & Expenditures, Workforce and Population

Employment, including minority employment, and income. The following tables display the employment and income of the six counties in the Dixie ZOI, and for comparison purposes, Utah State totals. Table BII-6 displays minority occupations by percent of the workforce in the listed occupations.

TABLE BII-5
PER CAPITA INCOME AND COUNTY RANK
1979

County	1978.1 = 100	Rank 29 counties in Utah
Piute	4009	26
Wayne	4605	23
Garfield	4686	21
Iron	4725	20
Washington	4773	19
Kane	5191	16
State of Utah	5094	

Source: Bureau of Economic Analysis, U.S. Department of Commerce

TABLE BII-6
MINORITY OCCUPATIONS (PERCENT)

	Garfield	Iron	Kane	Piute	Washington	Wayne	State TOTAL
Professional, technical & related		4.0			2.5		3.7
Nonfarm managers and administrators					2.4		3.2
Sales workers							1.9
Clerical workers		0.9			1.1		4.2
Craftsmen, foremen related		4.7			4.2		4.9
Operatives except transportation		1.7					8.2
Transportation equipment oper.					5.2		5.1
Nonfarm laborers		2.8			1.8		10.2
Service workers exc. private household		5.1			0.7	4.4	7.5
Private household workers							9.2
Farm workers		1.5	19.9		4.8		5.1

The occupation distribution figures for counties in the ZOI bear little resemblance to those for the State as a whole. In Iron County, the minority population tends to be employed in professional, technical, craft, and service-related occupations. In Kane County, the minority population is employed almost exclusively in farm work. In Washington County the minority labor is concentrated around craft workers and transport equipment operatives. Service workers account for the Wayne County minority employment. For the State as a whole, minority employment tends to be in the areas of non-farm laborers, private household workers, operatives, and service workers.

Revenues and Expenditures of State and Local Governments

This material is unavailable.

Workforce

The workforce of the ZOI varies considerably form area to area. Data on the workforce is not generally available on all the analysis units. However, the character of the workforce can be interpreted from the information presented below of some of the local industries and the number of people they employ: (source: 1980 Edition; Utah Fact Sheet).

1. Cedar City/Parowan Unit of Analysis

Employer	No. of Employees
Southern Utah State College	665
Federal, State, and Local Government	525
Iron County School District	300
Utah International	165
Valley View Medical Center	120
Coleman Company	100

2. Teasdale

Figures by employer are not available, however, ranching is very important to the local economy and a number of small sawmills are located in the area.

3. Escalante/Boulder

Employer	No. of Employees
Escalante Sawmill, Inc.	40
Vidrine Lumber Company	25
Federal, State, and Local Government	25
Garfield School District	20
Lincoln Lyman Construction Co.	15

4. Cannonville/Henrievile/Tropic

Figures by employer are not available, however, ranching, timber and government are chief area employers. Sawmill workers commute to Escalante while government workers are employed by the Forest Service and National Park Service.

5. Antimony/Circleville/Kingston

Employer	No. of Employees
Southern Utah Industries	25
Piute School District	12
Federal, State, and Local Government	10
Piute Cafe	5
Stans General Mercantile	5
Meadow Knoll Dairy	5
Brindly and Gould Dairy	?
Morgan Bros. Dairy	5
Fullmer Feed Co.	5
Millet Concrete Co.	5

6. John's Valley

Figures by employer are not available, however, several small ranching operations provide most of the employment. One oil well has been drilled and some ranchers commute in to work their ranches.

7. Panguitch

Employer	No. of Employees
Kaibab Industries	150
Federal, State, and Local Government	100
Garfield School District	70
Garfield County Hospital	55
Southern Utah Industries	45
Country Corner Care	20
Frandsen Lumber	5
Jerry's Ready Mix	5

8. St. George Environs

Employer	No. of Employees
Dixie Junior College	320
Federal, State, and Local Government	300
Washington School District	300
Dixie Medical Center	185
Moore Business Forms	165
Kellwood Company	150
St. George Steel Fabrication	125
J and J Mill and Lumber	55

9. Enterprise/Newcastle/Beryl

Figures by employer are not available, however, farming and ranching are important parts of the local economy. A transport sector has developed to support agriculture.

Population

The following two tables - BII-7 and BII-8 display the population and annual rate of change from the six counties in the Dixie ZOI.

Table BII-9 displays employment and income for the State of Utah by aggregated industrial sectors from selected years. Tables BII-10 through BII-15 display the same information for each county in the Dixie ZOI.

TABLE BII-7

Population of Counties Urban-Rural

County	1950		1960		1970		1980	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Piute		1911		1436		1164		1329
Wayne		2205		1728		1483		1911
Garfield		4151		3577		3157		3673
Iron	*N/A	9642	7543	3252	8946	3231	12730	4619
Washington	*N/A	9836	5130	5141	7097	6572	13555	12510
Kane		2299		2667		2421		4024

Source: U.S. Bureau of the Census, Census of Population
*Not available

TABLE BII-8

AVERAGE ANNUAL RATE OF CHANGE - PERCENT

County	1950-60	1960-70	1970-80	1980-90	1990-2000
Piute	-1.2	-0.9	0.5	1.7	0.6
Wayne	-1.0	-0.7	1.1	2.1	0.6
Garfield	-0.7	-0.5	0.6	1.3	0.7
Iron	0.5	0.6	1.5	1.3	0.8
Washington	0.7	-0.5	2.2	2.4	1.1
Kane	0.2	1.3	2.8	0.7	0.9

3. Model Description

The model translates Forest outputs and activities into employment and income impacts. An intermediate step is the translation of outputs into final demand dollars. Final demand expenditures is the amount consumer's pay for finished goods derived from Forest outputs. Final demand expenditure data was estimated for those industrial sectors which would be directly affected by a change in a Forest output or activity.

4. Definition of Outputs

For the IMPLAN sub models, expenditure data were developed for four outputs. These outputs are Forage, Timber, Developed Recreation, Dispersed Recreation. The final demand expenditures are based on dollars per unit of Forest output which are linked to those industrial sectors where the direct expenditure takes place.

The effects on income, jobs, and population for the alternatives compared to the 1985 base are displayed in table BII-16.

TABLE BII-9

UTAH STATE TOTAL

SECTORS	EMPLOYMENT						INCOME								
	1967		1977		1979		1967			1977			1979		
	PERSONS	% TOTAL	PERSONS	% TOTAL	PERSONS	% TOTAL	1967 $'s	1978.1 $'s	% TOTAL	1977 $'s	1978.1 $'s	% TOTAL	1979 $'s	1978.1 $'s	% TOTAL
Non-farm Proprietors	24955	6.3	34977	6.3	38735	6.3	215443	394942	9.8	51531	53410	8.0	66155	58904	7.7
Total Farm	25067	6.3	21478	3.9	20112	3.3	68711	125959	3.1	13412	13901	2.1	13447	11973	1.6
Mining	10329	2.6	14806	2.7	17730	2.9	87201	159854	4.0	6863	7113	1.1	5796	5161	0.7
Construction	13824	3.5	31799	5.7	35208	5.7	127745	234178	5.8	59672	61848	9.3	90258	80365	10.5
Manufacturing	50217	12.7	73829	13.3	86868	14.2	359355	658757	16.4	202288	209666	31.6	263987	235053	30.6
Trans. and Public Util.	23167	5.8	29074	5.2	33134	5.4	183974	337255	8.4	31504	32653	4.9	43323	38575	5.0
Trade (Whole and Retail)	72958	18.4	116685	21.0	128548	20.9	385419	706536	17.6	80734	83679	12.6	112793	100431	13.1
FN., INS., and R. EST.	13742	3.5	22990	4.1	26653	4.3	98464	180501	4.5	17583	18224	2.7	26502	23597	3.1
Services	49297	12.4	81121	14.6	91866	15.0	288336	528567	13.2	142190	147376	22.2	192307	171230	22.3
All Gov't	112502	28.4	129653	23.3	134760	22.0	592203	1085606	27.0	86736	89900	13.5	113208	100800	13.1
TOTAL	396058		556412		613614		2191408	4017212		640979	664357		861621	767185	
Per Capita Income+							2585	4739		4836	5012		5721	5094	

* Includes Farm Proprietors, farm labor, Ag. services, forestry, fisheries, and other.
+ By place of residence.
(D) Not shown to avoid disclosure of confidential data. Data are shown in totals.
(L) Less than $50,000. Data are included in totals (income). Less that 10 wage or salary jobs.

PIUTE COUNTY

TABLE BII-10

SECTORS	EMPLOYMENT						INCOME								
	1967		1977		1979		1967			1977			1979		
	PERSONS	% TOTAL	PERSONS	% TOTAL	PERSONS	% TOTAL	1967 $'s	1978.1 $'s	% TOTAL	1977 $'s	1978.1 $'s	% TOTAL	1979 $'s	1978.1 $'s	% TOTAL
Non-farm Proprietors	31	7.0	45	9.7	42	10.0	233	427	16.7	157	162	5.4	247	220	7.3
Total Farm*	190	42.6	165	35.6	154	36.7	422	774	30.3	938	972	32.3	1332	1186	40.0
Mining	26	5.8	21	4.5	(D)		160	293	11.5	293	303	10.1	(D)		
Construction	(L)		17	3.7	(D)		66	121	4.7	236	244	8.1	(D)		
Manufacturing	(L)		30	6.5	30	7.1	(L)			130	135	4.5	173	154	5.1
Trans. and Public Util.	(L)		(L)		0	0.0	(L)			(L)			(L)		
Trade (Whole and Retail	25	5.6	25	5.4	17	4.0	148	271	10.6	186	192	6.4	201	179	6.0
FN., INS., R. EST.	(D)		(L)		(D)		(D)			(L)			(D)		
Services	29	6.5	(D)		(D)		63	116	4.5	(D)			(D)		
All Gov't	131	29.4	136	29.4	129	30.7	468	858	33.6	957	990	32.9	1092	972	32.5
TOTAL	446		463		420		1393	2554		2907	3007		3365	2996	
Per Capita Income							1583	2902		4082	4231		4502	4009	

*Includes farm proprietors, farm labor, Ag. services, forestry, fisheries, and other.

+ By place of residence.

(D) Not shown to avoid disclosure of confidential data. Data are shown in totals.

(L) Less that $50,000. Data are included in totals (income). Less than 10 wage or salary jobs.

WAYNE COUNTY

TABLE BII-11

SECTORS	EMPLOYMENT						INCOME								
	1967		1977		1979		1967			1977			1979		
	PERSONS	% TOTAL	PERSONS	% TOTAL	PERSONS	% TOTAL	1967 $'s	1978.1 $'s	% TOTAL	1977 $'s	1978.1 $'s	% TOTAL	1979 $'s	1978.1 $'s	% TOTAL
Non-farm Proprietors	61	10.2	180	22.4	178	19.0	227	416	12.4	629	652	12.6	908	808	10.0
Total Farm*	247	41.4	192	23.9	179	19.0	558	1023	30.4	293	304	5.9	775	690	8.6
Mining	0	0	(D)		(D)		(L)			(D)			(D)		
Construction	(L)		49	6.1	54	5.8	(L)			913	946	18.3	1118	995	12.4
Manufacturing	(L)		29	3.6	32	3.4	(L)			212	220	4.3	228	203	2.5
Trans. and Public Util.	(D)		(L)		(L)		(D)			123	128	2.5	149	133	1.6
Trade (Whole and Retail	29	4.9	48	6.0	70	7.5	173	317	9.4	443	459	8.9	716	638	7.9
FN., INS., R. EST. Services	(D) 26	4.4	(D) 33	4.1	(D) 29	3.1	(D) 69	126	3.8	(D) 291	302	5.8	(D) 325	289	3.6
All Gov't	213	35.7	206	25.6	204	21.8	875	1604	47.6	1645	1705	33.1	1983	1766	21.9
TOTAL	596		805		936		1837	3368		4977	5159		9039	8048	
Per Capita Income							1683	3085		3958	4102		5360	4773	

*Includes farm proprietors, farm labor, Ag. services, forestry, fisheries, and other.
+ By place of residence.
(D) Not shown to avoid disclosure of confidential data. Data are shown in totals.
(L) Less that $50,000. Data are included in totals (income). Less than 10 wage or salary jobs.

GARFIELD COUNTY

TABLE BII-12

SECTORS	EMPLOYMENT						INCOME								
	1967		1977		1979		1967			1977			1979		
	PERSONS	% TOTAL	PERSONS	% TOTAL	PERSONS	% TOTAL	1967 $'s	1978.1 $'s	% TOTAL	1977 $'s	1978.1 $'s	% TOTAL	1979 $'s	1978.1 $'s	% TOTAL
Non-farm Proprietors	109	6.8	128	7.6	128	7.1	565	1036	9.5	1217	1261	9.8	1644	1464	9.1
Total Farm*	330	20.5	233	13.8	221	12.2	269	493	4.5	587	608	4.7	1095	975	6.1
Mining	(L)		65	3.9	185	10.2	(L)			1383	1433	11.1	3417	3042	18.9
Construction	156	9.7	47	2.8	52	2.9	1561	2862	26.3	956	991	7.7	1133	1009	6.3
Manufacturing	196	12.2	250	14.8	267	14.7	924	1694	15.6	2227	2308	17.9	3192	2842	17.6
Trans. and Public Util.	47	2.9	69	4.1	(D)		296	543	5.0	888	920	7.1	(D)		
Trade (Whole and Retail	136	8.5	181	10.7	140	7.7	436	799	7.4	1222	1267	9.8	1422	1266	7.9
FN., INS., R. EST. Services	(L) 209	13.0	(D) 296	17.5	(D) 305	16.8	(L) 639	1171	10.8	(D) 1701	1763	13.6	(D) 2308	2055	12.8
All Gov't	418	26.0	404	23.9	424	23.4	1703	3122	28.7	3334	3456	26.7	4013	3573	22.2
TOTAL	1609		1688		1813		5926	10863		12476	12931		18086	16104	
Per Capita Income							2204	4040		4714	4886		5830	5191	

*Includes farm proprietors, farm labor, Ag. services, forestry, fisheries, and other.

+ By place of residence.

(D) Not shown to avoid disclosure of confidential data. Data are shown in totals.

(L) Less that $50,000. Data are included in totals (income). Less than 10 wage or salary jobs.

IRON COUNTY

TABLE BII-13

SECTORS	EMPLOYMENT						INCOME								
	1967		1977		1979		1967			1977			1979		
	PERSONS	% TOTAL	PERSONS	% TOTAL	PERSONS	% TOTAL	1967 $'s	1978.1 $'s	% TOTAL	1977 $'s	1978.1 $'s	% TOTAL	1979 $'s	1978.1 $'s	% TOTAL
Non-farm Proprietors	385	8.4	542	8.5	602	8.9	2960	5426	14.2	5465	5664	10.4	7452	6635	10.5
Total Farm*	746	16.3	642	10.1	585	8.6	2016	3696	9.6	369	382	0.7	1655	1474	2.3
Mining	(D)		254	4.0	266	3.9	(D)			4268	4424	8.1	6176	5499	8.7
Construction	178	3.9	327	5.1	377	5.6	1576	2895	7.5	4497	4661	8.5	6323	5630	8.9
Manufacturing	270	5.9	405	6.4	493	7.3	1190	2181	5.7	3704	3839	7.0	5285	4706	7.5
Trans. and Public Util.	197	4.3	335	5.3	400	5.9	1505	2759	7.2	5771	5981	11.0	8634	7696	12.2
Trade (Whole and Retail	726	15.9	1441	22.5	1545	22.7	3439	6304	16.4	10507	10890	20.0	13502	12022	19.1
FN., INS., R. EST.	100	2.2	231	3.6	291	4.3	529	970	2.5	2226	2307	4.2	3352	2985	4.7
Services	387	8.5	653	10.3	651	9.6	2614	4792	12.5	6347	6578	12.1	8302	7392	11.7
All Gov't	1242	27.1	1533	24.1	1582	23.3	5362	9829	25.6	14914	15458	28.4	17619	15688	24.9
TOTAL	4575		6363		6792		20915	38341		52603	54522		70857	63091	
Per Capita Income							2248	4121		4464	4627		5172	4605	

*Includes farm proprietors, farm labor, Ag. services, forestry, fisheries, and other.

+ By place of residence.

(D) Not shown to avoid disclosure of confidential data. Data are shown in totals.

(L) Less that $50,000. Data are included in totals (income). Less than 10 wage or salary jobs.

KANE COUNTY

TABLE BII-14

SECTORS	EMPLOYMENT						INCOME								
	1967		1977		1979		1967			1977			1979		
	PERSONS	% TOTAL	PERSONS	% TOTAL	PERSONS	% TOTAL	1967 $'s	1978.1 $'s	% TOTAL	1977 $'s	1978.1 $'s	% TOTAL	1979 $'s	1978.1 $'s	% TOTAL
Non-farm Proprietors	111	12.3	205	15.4	214	16.4	533	977	18.8	1849	1916	21.4	2413	2149	24.0
Total Farm*	196	21.7	148	11.1	139	10.7	146	268	5.1	74	77	0.9	501	446	5.0
Mining	(D)		16	1.2	14	1.1	(D)			191	198	2.2	147	131	1.5
Construction	12	1.3	17	1.3	16	1.2	225	412	7.9	719	745	8.3	873	773	8.7
Manufacturing	(L)		55	4.1	67	5.1	(L)			334	346	3.0	500	445	5.0
Trans. and Public Util.	(D)		93	7.0	103	7.9	(D)			1000	1036	11.6	1194	1063	11.9
Trade (Whole and Retail	181	20.0	332	24.9	275	21.1	760	1393	26.8	2270	2353	26.3	2638	2349	26.3
FN., INS., R. EST.	(L)		37	2.8	44	3.4	(L)			334	346	3.9	412	367	4.1
Services	171	18.9	153	11.5	135	10.3	696	1276	24.5	1420	1472	16.5	1548	1378	15.4
All Gov't	216	23.9	281	21.0	296	22.7	881	1615	31.1	2280	2363	26.4	2728	2429	27.2
TOTAL	905		1335		1305		2837	5201		8628	8943		10549	9393	
Per Capita Income							2099	3848		4637	4806		5263	4686	

*Includes farm proprietors, farm labor, Ag. services, forestry, fisheries, and other.
+ By place of residence.
(D) Not shown to avoid disclosure of confidential data. Data are shown in totals.
(L) Less that $50,000. Data are included in totals (income). Less than 10 wage or salary jobs.

WASHINGTON COUNTY

TABLE BII-15

SECTORS	EMPLOYMENT						INCOME								
	1967		1977		1979		1967			1977			1979		
	PERSONS	% TOTAL	PERSONS	% TOTAL	PERSONS	% TOTAL	1967 $'s	1978.1 $'s	% TOTAL	1977 $'s	1978.1 $'s	% TOTAL	1979 $'s	1978.1 $'s	% TOTAL
Non-farm Proprietors	443	11.2	844	13.2	929	12.5	3115	5710	19.3	7860	8147	15.4	10449	9304	14.0
Total Farm*	607	15.4	452	7.1	429	5.8	2230	4088	13.8	2715	2814	5.3	3403	3030	4.6
Mining	(D)		28	0.4	64	0.9	(D)			251	260	0.5	1075	957	1.4
Construction	198	5.0	444	7.0	600	8.1	1431	2623	8.8	5636	5842	11.0	9313	8292	12.5
Manufacturing	187	4.7	502	7.9	641	8.6	800	1467	4.9	5450	5649	10.7	8635	7689	11.6
Trans. and Public Util.	76	1.9	136	2.1	186	2.5	579	1061	3.6	2531	2623	5.0	3665	3263	4.9
Trade (Whole and Retail	838	21.2	1718	26.9	1942	26.1	4379	8027	27.1	12902	13373	25.3	18246	16246	24.4
FN., INS., R. EST.	65	1.6	211	3.3	352	4.7	414	759	2.6	2146	2224	4.2	4047	3603	5.4
Services	453	11.5	761	11.9	904	12.2	2210	4051	13.7	8157	8455	16.0	12256	10912	16.4
All Gov't	1054	26.7	1280	20.1	1386	18.6	3943	7228	24.4	11264	11675	22.1	14099	12554	18.9
TOTAL	3953		6376		7433		16170	29642		51052	52914		74739	66547	
Per Capita Income							2116	3879		4462	4625		5307	4725	

*Includes farm proprietors, farm labor, Ag. services, forestry, fisheries, and other.
+ By place of residence.
(D) Not shown to avoid disclosure of confidential data. Data are shown in totals.
(L) Less that $50,000. Data are included in totals (income). Less than 10 wage or salary jobs.

TABLE BII-16
THE 1995 IMPACTS ON INCOME, JOBS AND POPULATION
FOR
THE EIGHT ALTERNATIVES: A-H
AND
PERCENTAGE CHANGES FROM THE 1985 BASE
TOTAL DIXIE NATIONAL FOREST

	Total Income (MM's)	Jobs	Population
Current 1985--A BASE	**19.3980**	**1,325.61**	**6,981**
Current 1995--A	19.6998	1,429.48	7,364
% Change from 1985 Base	1.56%	7.84%	5.48%
Composite 1995--B	21.0111	1,576.33	8,142
% Change from 1985 Base	8.32%	18.91%	16.65%
Constrained Budget 1995--C	17.7722	1,174.22	6,178
% Change from 1985 Base	-8.38%	-11.42%	-11.50%
Current Budget 1995--D	19.4802	1,399.60	7,275
% Change from 1985 Base	0.42%	5.58%	4.22%
Non-Market 1995--E	18.9251	1,418.50	7,320
% Change from 1985 Base	-2.44%	7.01%	4.86%
Market Emphasis 1995--E	17.4951	1,284.91	6,648
% Change from 1985 Base	-9.81%	-3.07%	-4.77%
RPA 80 1995--G	15.6690	1,050.92	5,525
% Change from 1985 Base	-19.22%	-20.72%	-20.85%
High Productivity 1995--H	20.2708	1,488.87	7,715
% Change from 1985 Base	4.49%	12.31%	10.51%

5. Social Impact Analysis

Social impact analysis estimates how Forest policies and actions affect the quality of life in the identified area. Future social conditions if current management were continued were compared with the potential impacts from other management alternatives.

Social impacts were measured by social variable such as lifestyles, attitudes, beliefs and values, social organizations, and population and land use.

Lifestyles effects are indicated by changes to the economic base, the major industries, cyclical employment, and the labor force participation rate.

Population and land use effects are indicated by changes to the rate of population change, the urban/rural structure, the use of rural land, new housing developments, and type of housing.

Attitudes, beliefs and values effects are indicated by management practices which are at odds with the local perception of Forests.

Social organization effects are indicated by increased polarization, or cooperation between the identified social, political, economic, and religious groups.

Table BII-17 provides a current description of the four factors in each unit of analysis:

The following discussion describes the effects of the alternatives on the four factors compared to the current program alternative (Baseline Matrix).

a. Lifestyles

Several of the alternatives project changes from the baseline in excess of 5% which would significantly impact the stability of lifestyles in comparison to the current program Alternative. Some alternatives that are commodity oriented such as Market Emphasis (Alt. F), 1980 RPA Program (Alt. G), and High Productivity (Alt. H), would be beneficial to timber and grazing interests and fuelwood gatherers. Those alternatives with limited budgets, such as Alternative C may have a greater potential to impact this social variable because it is not beneficial to any interest. The significance of change is difficult to predict because changes in other sectors of the unit may influence change.

b. Attitudes, Beliefs and Values

In comparing the alternatives to the Current Program Alternative in regard to this social variable, the Constrained Budget (Alt. C) has the greater potential for negative impacts. Alternatives B, F, G, H appear to be significant both positively and/or negatively in regard to impacting an individual's sense of freedom, and self sufficiency.

c. Social Organizations, Population and Land Use

It appears that the alternatives which would most significantly effect these social variables is the Constrained budget (Alt. C) however, alternatives B, F,G, and H would also have significant effects. The effects would be similar to those described for the lifestyle variable described above.

C. Other Models and Processes

Other models used to generate costs, activities, outputs of an alternative, such as wildlife and fish models, sediment models, range models, etc.

TABLE BII-17
BASELINE MATRIX

UNITS OF ANALYSIS	VARIABLES			
	LIFESTYLES	ATTITUDES, BELIEFS, VALUES	SOCIAL ORGANIZATION	POPULATION
Cedar City/ Parowan	Stable grazing, trade and service sectors. The mining sector has declined with closure of the iron mines; as a consequence, there is some underemployment in the unit.	The Forest is there for the local population to graze, cut firewood, and recreate on. There is a strong feeling against designating Land for "Non-Development"	The community is generally cooperative and cohesive. Some antagonism toward outsiders--particularly out-of-state people collecting Dixie NF firewood.	A steady trend of positive growth.
Teasdale	Ranching is very important to the local economy. There are a number of small timber operations.	The community would like to see some energy development locally.	A close-knit, cohesive community.	Same as above. Small group of retirees moving into the area.
Escalante/ Boulder	There is a split in employment between ranching, timber, and government work. The Dixie is important to the local economy.	Local feeling is pro-development of resources, and against designating Land for "Non-Development"	Conflict between locals who are pro-development and outsiders who advocate "Non-Development"	Same as Cedar City/Parowan unit of analysis.
Henrieville/ Tropic/ Cannonville	Same as above. Sawmill workers commute to Escalante. Government work is split between Forest and Park Service.	Same as above.	Same as above.	Same as above.
John's Valley	Small ranching operations. One oil well has been drilled. Some ranchers commuting in to work their ranches in the Valley.	For limited development of resources--energy and tourism.	No apparent conflicts.	No data available.
Panguitch	Farming and ranching is important. Many people have small acreages. There is a developed commercial timber operation, very dependent on the Dixie NF for timber.	For controlled development of mineral resources.	Some polarization is evident between old timers and newcomers.	Slight increase in population size over the past decade.
Antimony/ Circleville/ Kingston	Farming/ranching is the basic industry. There had been uranium mining, but the mines have closed down. The community was unable to absorb this impact, and families had to move from the area.	Preserve the quiet, isolation, and maintain an economy that supports the local population	Cohesive. Water use issues keep Circleville slightly apart from other communities.	Steady, positive growth in the Circleville, Kingston area. The population of Antimony declined.
Enterprise/ Newcastle/ Beryl	Farming/ranching is an important part of the local economy. A transport sector has developed to support the agriculture. The community has been able to absorb the impact of iron mines closing.	For gradual growth, but anti-big development. A recent example was the opposition to the proposed MX missile system.	Cohesive. Welcome newcomers to the area.	Same as Cedar City/Parowan unit of analysis.
St. George	A diverse and healthy urban economy. The biggest problem in relation to future development is water.	Range is important to the local (vocal) ranchers. Development of tourism and water facilities on Forest land are regarded as appropriate management.	Polarization between old timers and newcomers. The two groups disagree on appropriate ways to resolve issues.	Growing rapidly, with many newcomers moving into the area.

1. On-Site Soil Erosion

The Dixie National Forest chose to model on-site soil erosion rather than sedimentation because of the high natural background levels of sediment produced by many of the various erosive geologic formations that exist on the Forest.

It was determined that the difference in on-site erosion produced by the various alternatives would be a good environmental indicator of how long term soil productivity was being affected. It was further determined that only forested analysis areas would be modeled since timber harvesting is the major vegetation manipulating project proposed for the Dixie. Most of the rangeland vegetation manipulation projects have already been completed.

The erosion hazard for each analysis area was first calculated. The information used to calculate erosion hazard was obtained from the Forest Land Systems Inventory. Erosion hazard (in inches/year) is the amount of soil lost from an area with no vegetative ground cover. It is calculated by the formula EH = BER x ER x P x S.

EH = Erosion Hazard (inches/year) from bare soil
BER = Basic Erosion Rate (based on soil depth, texture, and permeability)
ER = Erodibility Coefficient (based on surface layer detachability, permeability of surface layer, permeability reduction in lower horizons, and rock fragments on soil surface and in soil profile)
P = Precipitation Coefficient (based on the 2 year, 30 minute storm)
S = Slope

On-site soil erosion (the erosion from an area in inches/year modified by the kind and amount of ground cover) was then calculated. On-site soil erosion was determined for each analysis area for the current situation. For each alternative the additional on-site soil erosion over the current situation was calculated based on changes in ground cover due to logging method and harvest method.

2. Water Yield Model

Vegetation manipulation (specifically timber harvest projects) represents the primary means of improving water yield on the Dixie National Forest. Therefore, the water yield model is tied directly to the projected timber harvest levels generated by the FORPLAN model. Significant additional water yield increments are projected for harvest activities in the spruce-fir, mixed conifer and aspen timber types. The general methodology incorporated in the water yield model is described in Potyondy, 1982., pp. 23-29. Hydrologic recovery curves similar to those on p. 27 of this report were postulated for aspen clearcuts, mixed conifer clearcuts, mixed conifer shelterwood harvests and spruce-fir clearcuts. An average initial water yield increase was postulated for each of these harvest types. Initial increase figures for clearcuts are based on data presented in Hibbert, 1979. The initial increase level for mixed-conifer shelterwood harvests is based on the methodology presented in USDA Forest Service, 1980., averaging all-exposures and using representative initial and residual basal areas. These data are the input parameters to a computerized water yield accounting model called WATSUM. This model keeps track of initial water yield increases from programmed projects during a given year as well as residual increases from projects in prior years.

Hibbert, Alden R. 1979. Vegetation Management for Water Yield Improvement in the Colorado River Basin. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. Unpublished report.

Potyondy, John P. 1982. Guide for Determining Water Yield Improvement Opportunities. USDA Forest Service, Intermountain Region.

USDA Forest Service. 1980. An Approach to Water Resource Evaluation of Nonpoint Silvicultural Resources (WRENSS) A Procedural Handbook. US Environmental Protection Agency, Athens, Georgia, EPA 600/8-80-012.

Water Yield Model Assumptions

Initial Level

-Assume existing water yield to be 481,000 acre feet per year average (from previous analysis).

-Assume that previously harvested stands still contribute a water yield increment residual. Over time these stands will achieve hydrologic recovery and reduce existing water yield to natural levels (assuming that no projects are implemented in the future).

-Assume that significant water yield increase residuals exist only in clear cut stands (all species) and partially cut (shelterwood) mixed conifer stands. No significant remaining residual exists for shelterwood harvests in ponderosa pine or selection harvests in the spruce-fir type.

-Assume that pre-1980 aspen clearcuts occurred in even increments from 1973 through 1979.

-Assume that pre-1980 clearcuts in other timber types occurred in even increments from 1960 through 1966.

-Assume that pre-1980 shelterwood harvests occurred in even increments from 1967 through 1979.

Recovery Curves

-Assume that hydrologic recovery curves are similar to those postulated in Figure 4, p. 27 of Potyondy, 1982.

-Assume that the beginning of the recovery period for spruce-fir and mixed conifer clearcuts is 10 instead of 15 years. This assumption is based on the fact that snow redistribution is of less importance in water yield inducement in the southern Utah mountains than in Region 4 as a whole. The effects of snow redistribution are generally longer lived than transpirational effects. Since transpirational effects are assumed to be more important in this area, a shorter period of non-recovery is postulated.

-Assume that the duration of the recovery period for mixed conifer shelterwood harvests is shorter than for clearcuts since it should take a shorter period to achieve restocking to preharvest levels. Assume that total recovery curve duration would be 40 instead of 50 years.

-Assume aspen clearcut recovery curve is same as postulated in Potyondy, 1982. (See attached figure for a graphical representation of recovery curves.)

Initial Increases

-Assume an average initial water yield increase of 5.0 inches per acre for aspen clearcuts. This is based on the presentation on pp. 36-38 in Hibbert, 1979. Aspen clearcuts will be allowed to regenerate after harvest.

-Assume an average initial water yield increase of 3.0 inches per acre for mixed conifer clearcuts. This is based on the presentation on pp. 34-36 in Hibbert, 1979. Mixed conifer clearcuts will be allowed to regenerate after harvest.

-Assume an average initial water yield increase of 4.0 inches per acre for spruce-fir clearcuts. This is based on the presentation on pp. 31-36 in Hibbert, 1979., and the assumption that the yield from spruce-fir stands in southern Utah more closely approximate southwestern mixed conifer forests than subalpine forests in Colorado.

-Assume an average initial water yield increase of 0.6 inch per acre for mixed conifer shelterwood harvests. This is based on applying the methodology presented in USDA Forest Service, 1980. This analysis interpolated between ponderosa pine and spruce-fir models, averaged all exposures, and assumed representative initial and residual basal areas.

-Assume an average initial water yield increase of 2.0 inches per acre for modified clearcuts in previously partially cut mixed conifer stands. This analysis based on applying the methodology presented in USDA Forest Service, 1980., and interpolated and averaged as above.

-Assume an average initial water yield increase of 2.0 inches per acre for ponderosa pine clearcuts. This is based on the presentation on pp. 38-39 in Hibbert, 1979. Ponderosa pine clearcuts will be allowed to regenerate after harvest.

-Assume no increase in water yield for ponderosa pine shelterwood harvests.

-Assume no increase in water yield for mountain brush conversions since only insignificant acreages will be treated.

-Assume no increase in water yield for pinyon-juniper conversions.

-Assume that the above vegetation manipulation projects will be the only water yield inducing projects which will be performed by the USDA Forest Service.

-Assume that past and future timber harvest activities within on Analysis Area were/will be distributed uniformly across the Forest with respect to the major watershed basins.

Water Yield Calculations

-Use WATSUM accounting model.

-Determine natural water yield by back calculating from existing water yield (481,000). Determine present increment over natural by considering water yield effects of pre-1986 harvests.

-For years 1980 through 1985, estimate acres harvested from timber volume figures supplied by silviculturalist. Assume these acres were/will be accessed in even increments over this period.

-Subtract 1984 estimated water yield increment from 481,000 to estimate natural water yield.

-Calibrate model to produce this background level.

-Do the same for the Colorado River Basin assuming current (1984) yield is 224,000.

Hibbert, Alden R. 1979. Vegetation Management for Water Yield Improvement in the Colorado River Basin. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. Unpublished report.

Potyondy, John P. 1982. Guide for Determining Water Yield Improvement Opportunities. USDA Forest Service, Intermountain Region.

USDA Forest Service. 1980. An Approach to Water Resource Evaluation of Nonpoint Silvicultural Resources (WRENSS) A Procedural Handbook. US Environmental Protection Agency, Athens, Georgia, EPA 600/8-80-012.

Explanatory Note

Water Yield Increases

Projected water yield increase over natural levels in any alternative is not necessarily a function of the volume of timber harvested nor is it a function of the total number of acres harvested. These assumptions might be reasonably accurate if the timber stands across the Forest were a homogeneous resource. (This is the case for several other Forests in the Intermountain Region). However, the Dixie National Forest timber base includes widely varying timber types requiring different silvicultural treatments to achieve adequate regeneration. For instance, the spruce-fir timber stands at the higher elevations have a totally different water yield augmentation potential than the drier open ponderosa pine stands at lower elevations. There is also a wide variance in the water yield induced by a clearcut harvest compared to a group selection or shelterwood harvest. All of these harvest methods are commonly used on this Forest.

The major timber types harvested on the Dixie National Forest are ponderosa pine, mixed conifer, spruce-fir and aspen. On this Forest ponderosa pine stands generally require a shelterwood harvest scheme in order to assure adequate, cost effective regeneration. This harvest method does not produce a significant increase in water yield. Therefore, a planning interval which has a high projected level of harvest in ponderosa pine will tend to have a low water yield increase per board foot or per acre of timber harvested. Aspen, on the other hand, requires a clearcut harvest and will produce large, though relatively short term, increases in water yield. Therefore, a planning interval with a high projected level of harvest in aspen will have a high water yield increase per board foot or per acre of timber harvested.

Mixed conifer stands show a great deal of variability on the Forest. Some require a shelterwood harvest and others require a clearcut harvest depending on their existing stand condition. These two harvest techniques will produce widely varying amounts of water yield. These stands are modeled and scheduled for harvest as separate, independent units. Therefore, harvest technique mixes in the highly variables mixed conifer type can also contribute to the low correlation between water yield increase and timber volume harvested. Clearcuts in spruce-fir will produce a relatively high water yield increase. Where appropriate, clearcut harvests have been programmed for this timber type. However, this harvest method is not a viable option for most of the spruce-fir timber base. A selection harvest will be the most commonly used method of cutting in these units. Once again, this leads to a low correlation of water yield to harvest volume.

In comparing the water yield figures within and between alternatives and benchmarks, it is very important to keep the above points in mind. As an example, during the 50 year planning period, the High Productivity Alternative produces less water yield increase than the RPA 1980 Alternative although the timber harvest is greater. This apparent inconsistency is easily explained by the larger aspen and mixed conifer clearcut harvest in the first three decades of the RPA 1980 Alternative as compared to the High Productivity Alternative. The water yield increases of the two alternatives tend to converge in the later planning periods as the effects from the initial harvest mix differential diminish.

It is also important to consider the timber harvest objective functions and constraints when comparing water yield increases of various alternatives and benchmarks. For instance, the Maximize Timber Benchmark produces less water yield during the 50 year planning period than either the RPA 1980 or Market Alternatives. However, the Maximize Timber Benchmark has a timber harvest policy constraint which precludes a departure (declining harvest level) between any ten year period. The two alternatives do not have such a constraint and consequently harvest higher levels of timber in the first 50 years and decline in later years. The average water yield increase in the Maximize Timber Benchmark would actually be higher than in any alternative if measured over the 150 year planning horizon. The expected decline in water yield increase in the Market, RPA 1980, and High Productivity Alternatives does not occur until after the 50 year planning period and therefore is not displayed in the Water Yield Tables in Chapter IV.

In comparing water yield increases projected for the Colorado River Basin to the Forest wide increases, one should be aware that the mix of timber types and harvest methods in the Colorado Basin is not the same as in the Great Basin or as exists Forestwide. Therefore, the projected water yield increases in the Colorado Basin for any alternative need not mirror the Forest-wide increases. Also there may be an increase in harvest in the Colorado Basin during an interval when Forest-wide harvest decreases (or vica versa) since harvests are not spread evenly across the Forest in any given interval. These factors are responsible for the apparent inconsistencies between Forest-wide and Colorado Basin water yield projections.

3. Use of the Prognosis Growth and Yield Model to Project Timber Yields

Various processes may be used to predict future timber yields over time for a given land area. Several timber growth and yield computer models have evolved in recent years. The USDA Forest Service, Intermountain Region, has adopted the PROGNOSIS model for use to predict stand growth and yield. The Utah Variant of PROGNOSIS was developed during the past two years specifically for use on Utah Forests. Internal growth functions were developed from forest inventory records on Utah Forests only, so this variant represents the most local and, therefore, the most accurate growth and yield model for the Dixie NF.

Analysis areas developed for Forest planning were the basic units for projection and were assumed analogous to stands for modeling purposes. Some analysis areas were aggregated into groups to reduce the number of yield tables to a reasonable number for subsequent use in FORPLAN. This aggregation was based on similarity of species composition, potential site productivity and expected response to treatment. The modeling process is described in the following sections separately for existing (empirical) and regenerated (managed) yield table development.

4. Documentation for Regenerated Yield Tables Using the Prognosis Growth and Yield Model

Considering the virtual absence of measured tree or stand data for natural or planted regenerated stands on the Forest, some logical assumptions to develop hypothetical regenerated stands to project through PROGNOSIS were made.

To simplify the modeling process, each regenerated yield table was comprised of a single species that, would provide the best growth and product value for the site. Several analysis areas were grouped into single regenerated yield tables based on expected similar growth responses among individual analysis areas within each group. This process resulted in six regenerated yield tables:

Existing Analysis Area	Regenerated Yield Table
AA-1, 8, 70, 73, 74, 75 (nonstock delay), 601	AA-1
AA-3, 78, 79 (delay), 203, 503, 603, 703, 803, 903	AA-3
AA-17, 19, 23, 24, 25, 35, 51, 54, 55, 57, 60, 257, 317, 623, 624, 649, 699, 717, 719, 724	AA-17
AA-13, 31, 36, 41, 63, 71, 76, 77, 331	AA-76
AA-29, 72	AA-29
AA-5, 6, 39, 542, 648, 698, 705, 706, 707, 739, 839	AA-5

Assumed regeneration stand parameters were based on:

1. Plantations, not natural regeneration (except AA-29 aspen).

2. General Forest historical averages with regard to trees per acre planted and expected survival.

3. Site index (height growth) measured for the 1979 timber inventory.

4. Ability of PROGNOSIS to "recognize" and project growth of small trees. (Initial data must represent trees with a reasonable diameter for their height).

INITIAL REGENERATED STAND DATA

YIELD TABLE NAME	SPECIES	TPA PLANTED	% MOR-TALITY	REMAINING TPA	AGE	DBH	HEIGHT	S1(50)
AA-1	DF	400	38	250	15	0.8	7	40
AA-3	PP	450	45	250	15	0.8	7	30
AA-17	DF	400	45	220	15	0.8	7	39
AA-76	ES	450	50	225	20	0.8	7	[illegible]
AA-29	AS	10000 1/	50	5000	5	0.5	7	46
AA-5	PP	400	50	200	15	0.8	7	23

1/ Natural regeneration

One PROGNOSIS run was done on each of these data sets with no additional calibration to provide an initial basis for PROGNOSIS calibration.

These uncalibrated projections used only internal PROGNOSIS growth and mortality functions. Upon analysis, it was realized that several calibrations would be necessary to reflect the following more accurately:

1. Mortality (internal rate too high).
2. Height growth (internal rate inaccurate).
3. Diameter growth.
4. Board foot: cubic foot ratio.
5. Gross volume - net volume relationship
6. Slower growth at old age.

The following discussion will summarize PROGNOSIS calibrations for these elements:

Mortality: The internal PROGNOSIS mortality function seemed arbitrary and removed too many trees based on local field observations. A more scientific approach to model mortality would be to use stand density index (SDI) values at a range of plus or minus 10 percent around the zone of imminent mortality for each species to initiate mortality. This approach is generally documented in

USDA FS Region 4 Timber Stand Improvement Handbook, 6/84 Amendment. This mortality is based on inter-tree competition at a given range of trees per acre by species. The PROGNOSIS keyword command "THINAUTO" was used to integrate this density - related mortality and a MORTMULT keyword multiplier of .001 was used to virtually eliminate the internal mortality function. Because of the relatively low number of trees per acre in each regenerated data set, however, the THINAUTO mortality function never took effect even in the untreated projections for 150 years. This is logical and expected as none of the stands began with more than 250 trees per acre. No data are available to document natural mortality from lightening, wind, snow, etc. It was decided that this type of mortality would be insignificant in regenerated stands and it was not modeled.

Height Growth. Even though the Utah PROGNOSIS model is keyed to site index for internal growth functions, the uncalibrated height growth did not accurately reflect expected tree heights at given ages compared to published site index curves approved for use in Region 4. PROGNOSIS REGHMULT and HTGMULT keyword multipliers were used to calibrate tree height growth and adjust projected tree heights to correspond as close as possible to those in the published site curves for the various species at ages 50 and 100.

Diameter Growth. The PROGNOSIS model can calibrate itself if the input tree data supplies a range of tree sizes. This range of tree data is available for existing stands (from timber inventory) but not for the hypothetical regenerated stands. Uncalibrated diameter growth rates were slower than expected. For lack of other data and rather than using arbitrary diameter growth multipliers, the READCORD keyword was used to calibrate diameter growth. Multipliers for READCORD were obtained from average initial scale factors for diameter reported by PROGNOSIS from each corresponding projection of existing stands which used timber inventory tree data. For example, PROGNOSIS calculated that actual diameter growth for ponderosa pine in analysis areas 5, 6, and 39 (existing stands) was 1.4 times the internal rate. A multiplier of 1.4 was then used with the READCORD keyword in regenerated stand AA-5 to calibrate diameter growth. This seemed to result in a more realistic (closer to expected) diameter growth rate. The only exception was for ponderosa pine in AA-3 that had an initial scale factor of 13.96 which was replaced with a multiplier of 1.4.

Old Age. PROGNOSIS does seem to have an interaction of internal functions to model slower basal area (thus diameter) growth at older ages, but since there is no specific internal function to project senescence and because of the use of READCORD which maintains the multipliers used with it at a constant rate in the constructed regenerated stands, a graphic analysis of culmination of near annual increment (CMAI) revealed that at least in some cases, culmination did not occur because trees did not slow in basal area growth at ages older than 120 to 140 years. This was probably the effect of the diameter growth multipliers used with READCORD. Little or no data could be found to document slowing of tree growth at physiological old age, or when senescence occurred in a given species. USDA Forest Service Agricultural Handbooks No. 271, "Silvics of Forest Trees of the United States" indicated some very general information for the different species. This source indicates that good growth rates can be maintained to age 300 in managed stands of Engelmann spruce, so slowing of basal area growth for old age in Engelmann spruce regenerated tables was not appropriate as 170 years is the oldest projected age. For all other species, the BAIMULT keyword was used to calibrate PROGNOSIS for sequenceses. Multipliers of .8, .7, .6, and .5 were used at tree ages of 100, 120, 140, and 160, respectively. Graphic analysis after introducing the BAIMULT keyword indicated a more reasonable display of CMAI.

Gross Volume - Net Volume Relationship.

Gross board foot/cubic foot to net board fot/cubic foot conversions were derived for each tree species and diameter using linear regression and substituting the regression into Prognosis. The same conversion factors were used for board foot and cubic foot conversions. Keywords MCFDPOLY and BFFDPOLY accommodated the equation in the Prognosis model. Cubic foot volume was based on the same merchantable portion of the tree as board foot using the volume keyword and specifying an 8" dbh to 6" top.

Data. A limited data set of 29 sales (the same sales used for the derivation of stumpage values) was used. Because of the limited data an expected "J" shaped curve in the relation of diameter and defect could not be fit to the data and a simple linear regression was used, forcing the line near the origin at 0 dbh and 0 defect. Data was weighted by gross sale volume.

For each species/species group, average DBH for the sale was regressed against total defect. Rearranging the equation to reflect net volume they become:

Species/Species Group	Equation
Ponderosa Pine	Net Volume = .9912 - .00523 (DBH)
Subalpine Fir	Net Volume = .9988 - .00858 (DBH)
Englemann Spruce/Douglas-fir	Net Volume = .9972 - .00556 (DBH)
Aspen	Net Volume = 1 - .02544 (DBH)

Board foot cubic foot ratio.

Board foot cubic foot ratios were computed directly from the Prognosis output by dividing merchantable board feet by merchantable cubic feet.

After determining all calibrations to be satisfactory, the following sets of PROGNOSIS projections were made (in addition to the uncalibrated set):

1. Calibrated, but without defect and no treatment.
2. Calibrated with defect and no treatment.

A range of prescriptions was then considered to display various treatment alternatives and schedules through the PROGNOSIS model. As all regenerated stands are even-aged, all prescriptions use shelterwood methods except AA-29 aspen which is clearcut. This range of shelterwood prescriptions includes very extensive, low intensity treatments such as seed cut and removal only or a precommercial thinning and/or only one intermediate harvest before the seed cut to three entries before the seed cut. Each prescription includes variable scheduling as well as several choices for residual stand density.

Basic Shelterwood Prescription Assumptions

1. The range of prescription choices must be wide enough to satisfy stated objectives for each forest planning benchmark and alternative. For example, a timber prescription must be available for the Maximize Range benchmark to maintain relatively low timber densities so transitory range forage will be available. For the Maximize timber benchmark and Market Emphasis alternatives, timber prescriptions must be available that will provide the highest timber volumes consistent with product size objectives.

2. All timber emphasis prescriptions will follow SDI guidelines in the Region 4 Timber Stand Improvement Handbook, 6/84 Amendment to the extent possible for use with PROGNOSIS.

3. Timber operators on the Forest operate in a sawlog market. A significant small products (roundwood) market currently does not exist and is not expected to exist in the foreseeable future. Sawlogs (8.0 dbh and larger) will, therefore, be the assumed product objective (except for aspen) throughout the planning horizon. Should a significant small products market appear (pulpwood, flakeboard mill, etc.) in the first decade a forest plan revision may be necessary.

Specific Assumptions for Timber Prescriptions

1. Precommercial thinning will not be done before trees are 30 years old or until expression of dominance is evident (seldom before age 30).

2. Precommercial thinning will be done only once and will leave residual stands in a free-growth condition (below the zone of competitive interaction - 15 to 20 percent of maximum SDI) to produce an average stand diameter (ASD) of 10 inches minimum for the first commercial entry.

3. A minimum ASD of 10 inches is necessary to provide enough volume for a commercial entry (logging costs vs. product value). Local timber operators have indicated that average removals of 1500 net board feet per acre are necessary to operate at a minimum profit at current costs and prices.

4. After stands have reached ASD of 10 inches, they will be grown within a range to optimize merchantable volume increment consistent with reasonable harvest volume levels (1500 to 6000 net board feet per acre). This range will usually be consistent with 20 to 50 percent of maximum SDI.

5. The seed cut will be considered as the regeneration harvest in shelterwood prescriptions. The seed cut will not take place at an age earlier than will yield 95 percent of the volume at CMAI unless an objective exists that overrides managing timber for timber values (such as Maximize Range benchmark).

5. Documentation for Existing Yield Tables Using the Prognosis Growth and Yield Model

Tree data for existing yield table development was taken directly from the 1979 Dixie NF timber inventory.

The original timber inventory stratification was based mostly on percent crown cover by species or forest type. This stratification was not compatible with analysis areas delineated for forest planning, so the timber inventory sample points were restratified by analysis area.

Based on similarity of species composition, potential productivity and expected growth response, tree data from several analysis areas were aggregated for PROGNOSIS modeling:

Existing Analysis Area	Existing Yield Table
AA-78 (stocked)	AA-3 (regenerated)
AA-79 (non-stocked)	AA-3 (regenerated delay 10 years)
AA-72 (stocked)	AA-29 (regenerated)
AA-1, 19, 35, 51, 54, 60, 8, 601, 719, 54	AA-1
AA-3, 203, 503, 603, 703, 803, 903	AA-3
AA-5, 705	AA-5
AA-6, 39, 739, 839, 706, 542	AA-39
AA-13, 41, 63	AA-13
AA-17, 55, 317, 717	AA-17
AA-23, 24, 25, 623, 624, 724	AA-23
AA-29	AA-29
AA-31, 331, 36	AA-31
AA-57, 257	AA-57
AA-70	AA-70
AA-71	AA-71
AA-73	AA-73
AA-74 (stocked)	AA-1 (regenerated)
AA-75 (non-stocked)	AA-1 (delay 10)
AA-76 (stocked)	AA-76 (regenerated)
AA-77 (non-stocked)	AA-77 (delay 10)

Tree data from the aggregated analysis areas were run through PROGNOSIS as one stand for each aggregation.

One PROGNOSIS run was done on each data set with no calibration so the internal functions of the model could be analyzed.

Calibrations were necessary to reflect the following more accurately:

1. Mortality.
2. Board foot: cubic foot ratio.
3. Gross volume - net volume relationship.

The following discussion will summarize PROGNOSIS calibrations for these elements:

Mortality. The internal rate was eliminated for the same season discussed in the regenerated yield table section. The THINAUTO keyword with multipliers to use SDI values was used as in the regenerated tables. Existing stands with relatively large numbers of trees per acre were affected by the THINAUTO mortality function. As in the regenerated stands, no data were available to document mortality other than inter-tree competition, so it was not modeled.

Board foot:cubic foot ratio.

See previous discussion under regenerated stands.

Gross volume - net volume relationship.

See previous discussion under regenerated stands.

After determining these calibrations to be satisfactory, the following sets of PROGNOSIS projections were made (in addition to the uncalibrated set):

1. Calibrated but without defects and no treatment.
2. Calibrated with defect and no treatment.

A range of prescriptions was then considered to display various treatment alternatives and schedules through the PROGNOSIS model. All stands except AA-29 (aspen) are uneven-aged because of actual stand condition or because of the effect of aggregating several stands into one.

As selection methods (unevenage management) are very difficult to model with PROGNOSIS, this modeling technique was eliminated from the list of choices as the time schedule for completion of yield tables would not allow this option. Careful use of PROGNOSIS keywords and their parameters should produce yield tables that, when used with appropriate constraints in the FORPLAN model, are expected to result in reasonable displays of unevenage management where appropriate. Unevenage management is being used rather loosely (in definition), as the objective will not be to maintain or create a balanced distribution of age classes, but to manage timber stands within limitations of critical limiting factors such as shallow soils, harsh sites, exposure to prevailing winds, etc., as well as stands constrained by visual quality and other non-timber objectives.

All analysis areas appropriate for application of evenage management using (simulated) shelterwood methods received such a prescription with a broad range of intensities and schedules. Analysis areas subject to critical limiting factors which would preclude use of shelterwood prescriptions were modeled using an initial overstory removal and subsequent clearcutting. Clearcutting prescriptions constrained (area control) in FORPLAN should reasonably project group selection as well as strip and patch clearcutting. These prescriptions and constraints were used for spruce-fir working groups.

Shelterwood prescriptions used an initial removal cut followed by thinning from below and seed cutting. The SPECPREF keyword was used as a modifier for THINBTA to simulate early removal of less desirable species in mixed conifer stands, such as true firs and limber pine.

The same general assumptions for the shelterwood prescriptions as discussed in the regenerated yield table section were used. The THINDBH keyword constrained to diameters of .1 to 7.5 and appropriate percentages of trees per acre was used to model precommercial thinning. The THINBTA or THINDBH keywords were used to model commercial intermediate treatments and the seed cut.

Intermediate treatments were done in existing stands consistent with SDI guidelines on the basis of numbers of trees per acre and diameter rather than using average stand age as a criteria. Seed cuts were applied when the diameter distribution ranged most closely around 20 to 22 inches in the merchantable trees. Use of CMAI to determine regeneration age in existing stands was considered inappropriate due to the unevenaged nature of the aggregated tree data.

Timber Yield Table Revision

The Forest Management Team was concerned that the yield tables developed from the 1979 inventory did not reflect the current standing volume (133.55 MMBF has been cut since 1979). All cut and sold reports from October 1, 1979, through September 30, 1984, were assembled, and volume cut by timber sale (and by analysis area) was compiled. Uncut sold volume was added as of September 30, 1984 to the cut volume. The table below displays the calculations used to reduce the current yield table volumes by the average volume per acre that has been cut since the timber inventory. The new starting inventory volume figures are more accurate for the beginning of the first planning decade. Growth for the period 1980 - 1985 has been previously built in to the yield tables and has been previously documented.

This process of yield table revision was discussed with Bob Cottingham (R.O.) on November 29, 1984 and he verified the procedure. The possibility of creating additional strata for these cutover areas had previously been discussed with Bob Cottingham and Rob Evans (Dixie NF analyst) as a more accurate way to reflect the current timber supply. It was agreed that the lack of time available would preclude this approach and that an update of the available timber volume on the average acre of existing analysis areas would be sufficiently accurate for this forest plan. When time allows, PROGNOSIS will be used to verify these yield adjustments.

1979 TIMBER INVENTORY REDUCTIONS FROM VOLUME CUT FY 1980 - 1985

FORPLAN LEVEL 2 IDENTIFIER	VOLUME CUT (MBF)	BF/CF CONVERSION	VOLUME CUT (MCF)	TRACTOR ACRES	CURRENT YIELD TABLE INV. VOL.	VOL./AC. CUT	NEW YIELD TABLE INV. VOL.	PERCENT OF ORIG. VOLUME
1	19,979	5.15	3,879	16,003	1.340	.24	1.100	82
3	77,582	4.16	18,649	83,767	1.040	.22	.820	79
5	4,314	4.20	1,027	2,724	.800	.38	.420	52
13	21,186	5.70	3,717	36,147	1.470	.10	1.370	93
17	940	5.13	183	5,375	1.170	.03	1.140	97
29	2,945	5.00	589	32,261	.980	.02	.960	98
39	1,739	3.85	452	7,393	.720	.06	.660	92
73	4,865	4.66	1,044	7,490	1.000	.14	.860	86

General References

1. USER'S GUIDE TO THE STAND PROGNOSIS MODEL
   Wycoff, Crookston and Stage USFS General Technical Report INT-133, September, 1982.

2. TIMBER STAND IMPROVEMENT HANDBOOK
   USFS Region 4, FSH 2409.26c, Chapter 300.

3. SILVICS OF FOREST TREES OF THE UNITED STATES
   USDA Forest Service Agriculture Handbook, No. 271, 1965

4. DIXIE NF TIMBER MANAGEMENT PLAN AND E.I.S.
   January 9, 1976

5. Personal Conversations:

   JIM MATSON, Resource Manager, Kaibab Industries
   STEVE STEED, Mill Manager, Escalante Sawmill
   GEORGE FRY, Consultant Forester (Escalante Sawmill)
   BOB COTTINGHAM, Timber Management Plans Specialist USFS Region 4
   HANK CHEATHAM, Timber Inventory Specialist, USFS Region 4
   MARV RUDE, Regional Mensurationist, USFS Region 4
   RON HAMILTON, Regional Geneticist, USFS Region 4
   ED HARVEY, Assistant Director for Inventories and Plans, USFS Region 4
   ROB EVANS, Operations Research Analysist, Dixie National Forest
   CALVIN BIRD, Timber Staff Officer, Dixie National Forest

D. Sources of Data

Data used in the analysis was developed from the following sources:

1. Definitions of outputs, activities and effects - Forest Service Manual, Management Information Handbook (FSH 1309.11a).

2. Administrative boundaries and landownership. Dixie National Forest Base Map.

3. Capability, Analysis Area, and Management Area Orthophoto Quads maps for the Dixie National Forest.

4. Empirical timber yield data-1979 inventory data.

5. Managed stand yield table - Prognosis Model.

6. Economics - Timber costs and values are described on page BII-103 other resource values are based on the 1980 RPA values as adjusted for Region 4.

7. Recreation coefficients in RVD's - Recreation Information Management (RIM) reports.

8. Recreation Opportunity Spectrum (ROS) mapped on Dixie National Forest base maps.

9. Forage Production Potential calculated from average yields contained in existing allotment management plan analyses.

10. Visual Resource study of the Dixie National Forest.

E. Economic Efficiency Analysis

1. Role In Process

In recent years, the Federal government has become increasingly aware of and committed to economic efficiency of Federal actions. The NFMA Regulations, ensuing WO and Department direction, reflect the idea that the Forest Service should consider economic efficiency in developing and choosing between Forest Plan alternatives. This section describes how the Dixie NF will comply with the direction.

The regulations specify that "each alternative shall represent to the extent practicable the most cost-efficient combinations of management prescriptions examined that can meet the objectives established in the alternatives." (36 CFR 219.12(f)(8). A program is said to be cost-efficient if it maximizes present net value subject to achieving specified levels of outputs and inputs (36 CFR 219.3). On the Dixie this will be done by:

A. Maximizing PNV for timber practices in FORPLAN. This will provide the levels of priced outputs in FORPLAN at an "Efficient" point, given the objectives of the alternative as reflected in the model.

B. Using PNV as one criterion for choosing prescriptions or activities not incorporated in the FORPLAN model (but which have an established benefit value); e.g., campground development, wildlife and fish projects, etc.

C. Using least cost as one criterion in choosing prescriptions or activities not incorporated in the FORPLAN Model which do not have an established benefit value; e.g., habitat improvement activities to maintain threatened and endangered species, levels of campground maintenance, etc.

Since only timber data was analyzed in FORPLAN the measure of economic efficiency of the other resources were calculated using discounting procedures. Trade-offs were considered between all costs, activities, standards and guidelines, and outputs on the Forest. To ensure that timber harvest activities were considered, however, environmental effects and some minor timber support costs were calculated after timber harvest activities were assigned to areas of the Forest as selected by FORPLAN.

Economic efficiency analysis alone should not be weighted too heavily in the decision process. PNV is often overstated as a decision criterion for two reasons:

a. Forest alternatives are described by a variety of factors. Included are activities, outputs, environmental effects, costs, benefits, PNV, etc. If PNV captured in their entirety all costs and benefits associated with each and every alternative, then the alternative with the highest PNV would be, by definition, the "economically efficient" alternative.

In practice, a variety of alternatives are simulated, each representing a unique way to resolve identified issues and concerns. When comparing two alternatives, care should be taken to compare the alternatives, each considered as a whole and not focus attention on any single factor, such as PNV. Even though each alternative has a different PNV, all alternatives are defined to be "cost efficient." The goodness or badness of an alternative cannot be determined in an economic sense because all are "cost efficient." Since not all outputs are valued there is not enough information to adequately describe economic efficiency, however, the benefits and costs can be used in making comparisons between alternatives.

b. Cost efficiency measures developed in the planning process (most notably PNV) may not be reliable. That is, there is an element of uncertainty associated with the stated PNV for any alternative. The uncertainty may be due to any of the following:

1) Not all outputs are explicitly valued; e.g., visual quality, maintenance of threatened and endangered species, minimizing negative impacts on local economies, etc. These outputs are often constrained to a specified level and are therefore achieved independent of the PNV calculation.

2) Some priced outputs may also be fixed; that is, specified as constraints.

3) Estimation techniques for valuing goods may not be accurate.

4) Values for nonmarket goods provided by RPA often reflect national averages. Local values may differ substantially.

5) Quality differences between priced nonmarket outputs typically are not valued explicitly; e.g., congestion differentials are not often considered for recreation.

6) Demand curves for priced outputs may not be identifiable at the Forest level.

7) Relationships between some Forest outputs are not well understood; e.g., anadromous fish spawning habitat capability to RVD's to dollars.

The uncertainty associated with the output and activity estimation is magnified by the uncertainty associated with estimating related economic parameters, rendering the PNV estimate less reliable than the estimates associated with the activities and outputs themselves.

D. Multiple Use management prescriptions listed previously in this section were applied and mapped to appropriate areas of the Forest to meet the goals and objectives of each alternative. Mapping was facilitated by the use of "overlays" containing resource information. The following resource "overlays" were used:

Available, Capable and Suitable Timber Lands
Suitable Range Lands
Recreation Opportunity Spectrum (ROS)

Riparian Areas
Wildlife and Fish Habitat Areas
Research Natural Areas
Wilderness Areas
Municipal Water Supply Watersheds
Developed Recreation Areas and Winter Sports Areas

An interdisciplinary team of forest planning specialists and Ranger District and Staff personnel assigned a priority or importance to each of the 20 (21 including General Forest Direction) multiple use management prescriptions available to be applied to an area of the Forest. The priority was based on the goals and objectives of the alternative. Those prescriptions for which there was no choice as to whether they would be used or not; such as, wilderness and municipal water supply watersheds received a number 1 priority and were mapped first. Not all prescriptions were used. Areas on the Forest that required no emphasis (were deemed insufficient in meeting alternative goals) or were incapable of responding to emphasis were assigned the "General Forest Direction" prescription.

After each alternative was mapped into Management Areas (the area to which the prescription was applied) the size of each area was determined. Estimates by alternative of the activities and outputs for resources other than timber were then made. FORPLAN was run and constrained based on how the management prescriptions were mapped. Timber output estimates then came from FORPLAN. Environmental effects due to timber harvest activities and some minor timber support costs were calculated after timber harvest activities were assigned to areas of the Forest as selected by FORPLAN. Benefit values for outputs were supplied by Region 4 and FORPLAN.

Timber costs were calculated in FORPLAN. Cost estimates for Non-FORPLAN activities were made by the planning team. Costs reflected the most efficient method of achieving alternative objectives given standards and guidelines and non-priced resource needs. Calculations were then made by multiplying the number of units of activities and outputs times unit costs and benefits on an annual basis. The calculation yields total annual benefits and costs for each of the five decades of the planning period.
Economic efficiency as defined by present net value (PNV) was then measured by computing the present value of the costs (PVC) and benefits (PVB). This analysis is used to determine the economic efficiency of the alternatives and to compare with the economic efficiency of the benchmarks. The present value of benefits and costs were determined by discounting the values at 4% and 7 1/8% from the midpoint of each decade. Present net value is computed by subtracting the present value of the costs from the present value of the benefits.

To "maximize present net value" for priced outputs other than sawtimber (in FORPLAN), the present net value of different output (benefit)/activity (cost) combinations were reviewed and the combination with the highest present net value was selected. The present net value for each output was then accumulated. This procedure is satisfactory for the "Maximize PNV Benchmarks" given the very limited amount of joint production, opportunities between resources on the forest and the low level of timber harvest when PNV is maximized in FORPLAN which creates limited possibilities for tradeoffs to occur. For Forest planning alternatives, outputs other than timber are viewed as discrete sets representing the goals of the alternative.

2. Non-FORPLAN Pricing Estimates Used (all values are in first quarter 1978 dollars)

Resource prices reflect onsite values for all resources and are classified as market values (timber, range, and developed recreation) or non-market values (dispersed recreation, increased water yield, and wildlife). The following discussion describes the prices used in the planning process:

Sawtimber Benefits

See the discussion on Timber Benefits in this Chapter (II.E.6)

Range Benefits

The production of livestock forage was assumed to have no significant effect on the price of a unit of grazing, and it was also assumed that all grazing produced on the Forest will be purchased. The value of livestock forage per AUM is $5.80 per AUM. This value is assumed to be constant over the planning horizon and is based on pounds of beef marketed, production costs, season of grazing on the Forest, and livestock market prices as determined by Kerry Gee, USDA Economic Research Service.

Recreation and Wildlife Benefits

The benefit values for recreation and wildlife are shown in the following table:

RESOURCE	UNIT OF MEASURE	PRICE	SOURCE
Recreation Developed	RVD	$ 3.00	RPA Recreation
Recreation Dispersed	RVD	3.00	RPA Recreation
Recreation Wilderness	RVD	8.00	RPA Recreation
Big Game User Days	WFUD	23.10	RPA Wildlife & Fish
Fish User Day	WFUD	17.85	RPA Wildlife & Fish

Increased Yield Water Benefits

The increased water yield benefit value is $42.00 per Acre-foot. This value was applied to both the Colorado River Basin and the Great Basin.

Minerals Benefit

The benefit values used for minerals is displayed in the following table:

OUTPUT	UNIT OF MEASURE	VALUE	SOURCE
Common Variety Minerals	M Tons	$181.33	Dixie NF Sales
Lease Rentals Energy/Non-Energy	Acres	.73	RPA Minerals
Oil and Gas Production	BBTUs	302.63	RPA Minerals
Coal Production	BBTUs	101.82	RPA Minerals
Uranium Production	BBTUs	11.60	RPA Minerals

Cost Estimate

The budget cost of doing the forest activities necessary to provide the benefits from forest lands were developed by Forest personnel. The costs were based on historical data and professional judgment and approximate the minimum funds needed to achieve the standards and guidelines in the management prescriptions given output objectives.

3. Demand Assumptions

Generally, we assume that price does not vary with Forest output levels. The only downward sloping demand curves used are associated with recreation and wildlife and fish user days. The methodology used to estimate the demand curves is one where price is assumed to be constant up to the projected use level and zero for output levels beyond. Projected use will vary through time. (See ECNPB*VALUES available at Dixie National Forest SO and Intermountain RO.)

4. Trend Assumptions

It is assumed for this analysis that real prices and costs remain constant over the planning horizon. Inflation was not included in the discount rates, benefits, and costs due to the difficulty of estimating future inflation rates and because inflation was assumed to equally affect both costs and prices.

5. Interest Rate Assumptions

Two discount rates representing the cost of money over time were used in the economic analysis. For evaluation of long term investments in land and resource management, 4 and 7 1/8 percent real discount rates were used. This was done to determine the sensitivity of the alternatives to variations in the discount rate.

6. FORPLAN Pricing Assumptions

The following documents the costs and benefits related to sawtimber production used in the FORPLAN Model on the Dixie National Forest.

a. Timber Activities and Associated Costs

The Forest used the 1986 submitted Timber Budget as a baseline for computing costs. The 1986 budget was a major Forest effort, with each unit on the Forest giving close scrutiny to their actual costs. The combined unit budgets were also reviewed by the Forest Management Team for accuracy and completeness. The use of the 1986 budget as a baseline was based on the assumption that we could not increase the line item accuracy by "constructing" costs nor would previous budget years reflect the necessary detail. In order to formulate budget constraints in the FORPLAN model the costs used in the model were added for 1986 and figured as a per cent of the 1986 budget (less Working Capital Fund). The percentage (around 35%) was then applied to the 10 year average Forest budget outlined in the R-4 checklist to arrive at the Current Budget and Constrained Budget level. Unit costs were placed on a per acre basis to reflect a change in MBF unit cost with volume per acre. Also, budgeting costs were "leveled" to express activities in terms of sale offerings. For example, though most sale administration and preparation costs are incurred either before or after offering, they were expressed in cost per offering unit. It was assumed that these would be reasonable costs given a stable program, where sale prep and administration costs and offering were leveled.

TABLE BII-18
SUMMARY OF COSTS
EXPRESSED ON A PER ACRE BASIS IN $1978 BY TREATMENT CLASS

		+---------TREATMENT CLASS			-----------------+	
DEFINITION	BASELINE* 1986 BGT	PRECOM. THIN	SHELTERWD. +COMM. TH.	CLEARCT.	ASPEN CLRCT.	PCT w/ SALE
- Res. Coord.	$3.94	$2.00	$3.94	$3.94	$3.94	------
- Wldlf. Coord.	1.24	1.24	1.24	1.24	1.24	------
- Tmbr. Plng.	.86	.86	.86	.86	.86	------
- Silv. Exam	6.85	------	6.85	------	------	------
- Reforest.**	231.00	------	231.00***	231.00	------	------
- TSI (apprp.)	61.12	61.12	------	------	------	53.70
(KV)	53.70					
-Sale Prep.	29.39	------	29.39	22.04	10.00	------
(steep slopes)	33.80	------	33.00	25.35	10.00	------
-Sale Admin.	25.92	------	25.92	7.77	5.00	------
(steep slopes)	27.22	------	27.22	15.00	5.00	------
-Res. Coord. SWA****	2.46	1.50	2.46	2.46	1.50	------
-Improvement	.08	------	.08	.08	------	------
-Brush Disp.	15.00	15.00	15.00	16.00	------	------
-Law Enforce.	.92	------	.92	.92	------	------
-Pgm. Pln. Admin.	7.23	4.09	7.23	7.23	1.50	------

*Costs were either applied directly from baseline, or adjusted based on estimates of change from baseline to the treatment class.

**Additional reforestation costs of $90 to $270 per acre were added to analysis areas identified as hard to regenerate.

*** Seed cut only.

****Costs were adjusted by Forest specialists based on a Region 4 formula after the model was run. Effect of this change on PNV and total Forest budget were deemed insignificant. Effect on the soil/water program budget were deemed significant, however, and the changes were made for program budget submissions.

Timber sale engineering support costs and construction and reconstruction costs for local roads (per acre based on assumed optimum density). Costs are weighted for construction and reconstruction based on percent with roads in place.

TABLE BII-19

	INITIAL ENTRY COSTS				SUBSEQUENT ENTRY
DESCRIPTION	0-25% ROADED	26-50% ROADED	51-75% ROADED	76-100% ROADED	100% ROADED
-Bnd. Loc.	$4.54	$3.24	$1.95	$0.65	------
-Trans. P&I	7.72	7.72	7.72	7.72	7.72
-Precon. Eng.	23.24	18.35	13.45	8.56	6.11
-Rd. Mtc.	6.59	6.59	6.59	6.59	6.59
-Purch. Rd. Con. (tractor logging)	25.57	20.77	15.96	11.16	8.75
-Purch. Rd. Con. (shortspan cble.)	28.13	22.85	17.56	12.28	9.63
-Purch. Rd. Con. (longspan cble.	12.79	10.38	7.99	5.58	4.38

b. Sawtimber Benefit Values

Sawtimber values were developed to reflect the market value for the final product minus the production costs from the stump on the Forest to the final product.

The procedure used to develop timber values for the FORPLAN model is based on linear regression analysis. The analysis relates historic stumpage values to some market variables and site variables that can be used in FORPLAN, to help determine which management practices are economically and silviculturally the most reasonable.

Data collected from 44 timber sales on the Dixie National Forest from the period of 1975 to 1984. Linear regression equations to predict timber values were developed using a computer program called SPSS (Statistical Package for the Social Sciences). High bid value per thousand board feet (BVPM) was the predicted or dependent variable, while various combinations of other variables were used as independent variables, such as:

SPLST=SELLING PRICE LOG SCALE
BDF=BRUSH DISPOSAL FUND
ADBH=AVERAGE DBH
LNDBH=LNADBH
BIDS=NUMBER OF BIDDERS
ANEFF=NON-EFFECTIVE PURCHASER CREDITS
HTIME=HAUL TIME
PVTR=PER CENT VOLUME TRACTOR LOGGED
YDTRA=AVERAGE TRACTOR SKIDDING DISTANCE
VPA=AVERAGE VOLUME PER ACRE

All variables were weighted by the net sale volume. The criteria for selecting the best regression model were:

1. The coefficient of determination (R squared) must be greater than .50.

2. The overall regression, as well as the regression coefficients, should be statistically significant at the 90% confidence level.

3. The coefficients in the model selected are all capable of reasonable interpretation on the basis of the way in which one would expect the market to value timber.

Using these criteria; BDF, SPLST, BIDS, YDTRA, AND ADBH were found to be statistically significant in predicting BVPM. The equation with the ADBH variable may be slightly more significant than the one using the LNDBH variable. However, due to the intuitive relationship between the high bid and DBH, where it is assumed to be an exponential one rather than a linear one, it was decided that the equation using the LNDBH variable will be the one used to estimate timber values. The resulting equation is:

$$\text{BVPM} = -152.469 - .433\,(\text{BDF}) + .663\,(\text{SPLST}) + 17.43\,(\text{BIDS}) - .040\,(\text{YDTRA}) + 7.005\,(\text{LNDBH})$$

Since in Forest Planning, the value used in measuring unit benefits is Gross Returns per MBF (GRPMBF), this is the same as high bid or stumpage value except the equation includes contributions to the brush disposal fund and non-effective purchaser credit. The equation becomes:

$$\text{GRPMBF} = \text{BVPM} + \text{BDF} + \text{ANEFF} = -152.469 - .433\,(\text{BDF}) + .663\,(\text{SPLST}) + 17.43\,(\text{BIDS}) - .040\,(\text{YDTRA}) + 7.005\,(\text{LNDBH}) + \text{BDF} + \text{ANEFF}$$

Some variables such as BDF, BIDS, YDTRA, AND ANEFF cannot be predicted in the long run, but only on a site specific basis. Therefore, their past averages are substituted into the equation and the final equation becomes:

$$\text{GRPMBF} = -152.469 - .433\,(7.701) + .663\,(\text{SPLST}) + 17.43\,(1.363) - .040\,(528.442) + 7.005\,(\text{LNDBH}) + 7.701 + 8.824 =$$

$$-136.659 + .663\,(\text{SPLST}) + 7.005\,(\text{LNDBH})$$

Using the weighted average size and species composition of the timber sold in the 44 sales in the timber value analysis GRPMBF is presented here, but will increase or decrease dependent on size and species composition of the timber.

44 Sale Weighted Average DBH = 17.75 Inches
44 Sale Weighted Average SPLST = $251.16

Substituting these averages into the final equation:

$$\text{GRPMBF} = -136.659 + .663\,(251.16) + 7.005\,(\text{LN } 17.75) = \$50.00$$

All of the sales examined were 100% tractor logged, therefore, this variable was not considered in the development of the equation. For planning purposes, figures of $40.00 per MBF for shortspan logging and $90.00 per MBF for helicopter and longspan cable were included in the FORPLAN model as additional logging costs, where applicable. These additional costs reduce GRPMBF on analysis areas requiring cable logging. It would have been desirable to vary the costs by size of material yarded to provide more accurate cost data. Few cable sales have transpired on the Dixie, however, and lack of data makes a more refined breakdown impossible.

TABLE BII-20
GROSS RETURNS PER MBF BY WORKING GROUP, LEVEL 2 IDENTIFIER, AND DIAMETER CLASS (in inches)*
*ASSUMES TRACTOR LOGGING

Existing Mixed Conifer Stands, Level 2: 19,35,51,60,7E,54,6F,6H,01,08,6A

Min. Diam.	Max. Diam.	1978 Dollars per MCF
0.0	14.0	222.18
14.0	15.0	227.33
15.0	16.0	232.54
16.0	17.0	237.43
17.0	18.0	241.91
18.0	19.0	246.91
19.0	20.0	251.57
20.0	21.0	259.07
21.0	22.0	263.84
22.0	23.0	268.26
23.0	24.0	272.63
24.0	40.0	277.11

Regenerated Mixed Conifer, Mixed Conifer with Aspen, and Mistletoe Infected Mixed Conifer Stands, Level 2: 19,35,51,60,7E,54,6F,6H,57,2B,17,55,3A,7D,23, 24,25,6C,6D,7F

Min. Diam.	Max. Diam.	1978 Dollars per MCF
0.0	12.0	116.42
12.0	13.0	132.33
13.0	14.0	150.18
14.0	15.0	177.46
15.0	16.0	181.66
16.0	17.0	192.08
17.0	18.0	199.32
18.0	19.0	205.59
19.0	21.0	215.71
21.0	40.0	227.81

Regenerated Mixed Conifer, Cutover Mistletoe Infected Mixed Conifer, Cutover Mixed Conifer, and Stocked and Nonstocked (Existing and Regenerated) Mixed Conifer Stands, Level 2: 01,08,6A,70,73,74,75

0.0	11.0	111.47
11.0	12.0	126.47
12.0	13.0	143.35
13.0	14.0	173.11
14.0	15.0	182.40
15.0	16.0	198.37
16.0	17.0	203.66
17.0	18.0	208.99
18.0	19.0	217.58
19.0	20.0	222.74
20.0	21.0	225.49
21.0	22.0	228.76
22.0	23.0	232.28
23.0	25.0	237.84
25.0	40.0	246.21

Existing Ponderosa Pine Stands, Level 2: 03,2A,5A,6B,7A,8A,9A

0.0	14.0	191.26
14.0	15.0	200.53
15.0	16.0	209.33
16.0	17.0	218.60
17.0	18.0	227.98
18.0	19.0	237.46
19.0	20.0	246.15
20.0	21.0	255.55
21.0	22.0	265.04
22.0	23.0	274.30
23.0	24.0	283.34
24.0	25.0	292.76
25.0	26.0	302.26
26.0	27.0	311.82
27.0	40.0	321.11

Regenerated Ponderosa Pine and Stocked and Nonstocked Clearcut (Existing and Regenerated) Ponderosa Pine Stands, Level 2: 03,2A,5A,6B,7A,8A,9A,78, 79

0.0	12.0	133.07
12.0	13.0	137.51
13.0	14.0	189.95
14.0	15.0	230.40
15.0	16.0	245.79
16.0	17.0	259.16
17.0	18.0	269.50
18.0	40.0	279.08

Existing Spruce-Fir Stands, Level 2: 13,41,63

0.0	13.0	200.86
13.0	14.0	206.91
14.0	15.0	212.65
15.0	16.0	218.08
16.0	17.0	223.57
17.0	18.0	228.73
18.0	19.0	234.35
19.0	20.0	239.62
20.0	21.0	244.55
21.0	22.0	249.91
22.0	23.0	254.91
23.0	24.0	259.97
24.0	25.0	265.05
25.0	26.0	270.19
26.0	40.0	274.94

Regenerated Spruce-Fir, Cutover Spruce-Fir, and Stocked and Nonstocked Clearcut (Existing and Regenerated) Spruce-Fir Stands, Level 2: 13,41,63, 31,3B,36,71,76,77

0.0	10.0	205.41
10.0	11.0	211.93
11.0	12.0	218.16
12.0	13.0	224.48
13.0	14.0	227.69
14.0	15.0	233.73
15.0	17.0	241.70
17.0	40.0	251.26

Existing Mixed Conifer with Aspen Stands, Level 2: 17,55,3A,7D

0.0	11.0	170.32
11.0	12.0	175.54
12.0	13.0	180.49
13.0	14.0	185.86
14.0	15.0	190.58
15.0	16.0	195.36
16.0	17.0	199.83
17.0	18.0	204.71
18.0	19.0	209.28
19.0	20.0	213.51
20.0	21.0	217.78
21.0	22.0	222.49
22.0	23.0	226.45
23.0	24.0	230.85
24.0	25.0	235.28
25.0	40.0	238.57

Existing Mixed Conifer and Aspen Stands, Level 2: 23,24,25,6C,6D,7F

0.0	14.0	165.51
14.0	15.0	169.34
15.0	16.0	172.87
16.0	17.0	175.93
17.0	18.0	179.36
18.0	19.0	182.47
19.0	20.0	185.97
20.0	21.0	188.60
21.0	22.0	192.16
22.0	23.0	194.84
23.0	24.0	197.90
24.0	25.0	200.63
25.0	26.0	203.74
26.0	27.0	206.49
27.0	40.0	209.12

Cutover (Existing) Mixed Conifer Stands, Level 2: 70

0.0	13.0	161.38
13.0	14.0	166.87
14.0	15.0	172.12
15.0	16.0	177.06
16.0	17.0	182.16
17.0	18.0	187.32
18.0	19.0	192.56
19.0	20.0	197.53
20.0	21.0	202.14
21.0	22.0	207.22
22.0	23.0	212.01
23.0	24.0	217.19
24.0	25.0	222.08
25.0	26.0	227.01
26.0	27.0	231.54
27.0	40.0	236.19

Cutover (Existing) Spruce-Fir Stands, Level 2: 71

0.0	17.0	215.52
17.0	18.0	219.05
18.0	19.0	222.61
19.0	20.0	226.18
20.0	21.0	229.39
21.0	22.0	232.62
22.0	23.0	235.46
23.0	24.0	238.72
24.0	25.0	242.00
25.0	26.0	244.90
26.0	27.0	247.80
27.0	28.0	250.31
28.0	29.0	253.26
29.0	30.0	256.20
30.0	40.0	259.18

Existing Mixed Conifer and Ponderosa Pine Stands, Level 2: 05,7B

0.0	12.0	156.38
12.0	13.0	167.57
13.0	14.0	179.51
14.0	15.0	191.42
15.0	16.0	202.94
16.0	17.0	214.95
17.0	18.0	227.12
18.0	19.0	238.83
19.0	20.0	250.99
20.0	21.0	262.68
21.0	22.0	275.10
22.0	23.0	286.69
23.0	40.0	299.34

Regenerated Mixed Conifer and Ponderosa Pine Stands, Level 2: 05,7B

0.0	13.0	120.05
13.0	14.0	162.93
14.0	15.0	199.36
15.0	16.0	218.40
16.0	17.0	248.41
17.0	40.0	262.79

Existing Low Productivity Ponderosa Pine, Level 2: 06,39,8B,5B,6E,6G,7C

0.0	15.0	185.04
15.0	16.0	197.79
16.0	17.0	210.49
17.0	18.0	222.71
18.0	19.0	235.71
19.0	20.0	247.95
20.0	21.0	260.94
21.0	22.0	273.42
22.0	23.0	286.36
23.0	40.0	299.08

Regenerated Low Productivity Ponderosa Pine, Level 2: 06,39,8B,5B,6E,6G,7C

0.0	13.0	120.05
13.0	14.0	162.93
14.0	15.0	199.36
15.0	16.0	218.40
16.0	17.0	248.41
17.0	40.0	262.79

Existing Spruce-Fir Stands, Level 2: 31,3B,36

0.0	13.0	213.41
13.0	14.0	218.86
14.0	15.0	224.38
15.0	16.0	229.96
16.0	17.0	235.20
17.0	18.0	240.51
18.0	19.0	245.86
19.0	20.0	250.44
20.0	21.0	255.47
21.0	22.0	260.55
22.0	23.0	265.25
23.0	24.0	270.43
24.0	40.0	275.20

Existing Mistletoe Infected Mixed Conifer Stands, Level 2: 57,2B

0.0	17.0	204.29
17.0	40.0	214.91

Cutover (Existing) Mistletoe Infected Mixed Conifer Stands, Level 2: 73

0.0	21.0	227.54
21.0	40.0	229.67

Existing and Regenerated Pure Aspen Stands, Level 2: 29,72

0.0	40.0	23.73

Existing and Regenerated Aspen Component of Mixed Hardwood/Softwood Stands
Level 2: All Conifer Stands With an Aspen Component

0.0	40.0	23.73

A summary of returns per thousand board feet is displayed by decade (1-5) for each alternative, extremely low returns indicate higher amounts of cable and longspan cable logging and higher volumes of aspen sawtimber, (1978 dollars).

	Gross Returns Per MBF*				
Alternative	1ST DECADE	2ND DECADE	3RD DECADE	4TH DECADE	5TH DECADE
A	$38.00	38.47	28.34	15.64	21.81
B	38.00	38.47	28.34	15.64	21.81
C	40.52	33.03	30.81	33.53	24.94
D	43.69	30.03	15.68	22.93	24.65
E	57.44	45.21	37.90	37.05	35.53
F	40.47	30.67	10.72	23.55	19.59
G	44.02	14.44	21.66	20.99	12.82
H	37.20	9.84	29.82	-3.98	31.06

*Total returns divided by total MBF per decade

c. Fuelwood and Roundwood Prices- these products were not included in the FORPLAN model and represent a small portion of the Forest's Timber program. They are displayed here for convenience.

Product	Unit of Measure	Price/MCF
Softwood Roundwood	MCF	50.00
Softwood Personal Use Firewood	MCF	24.00
Hardwood Roundwood	MCF	24.00
Hardwood Personal Use Firewood	MCF	24.00

III. BENCHMARKS

A. Purpose

Benchmarks were developed as part of the Analysis of the Management Situation (AMS) which was the major analysis step prior to beginning the development of Forest planning alternatives. In summary, the AMS provided the parameters for formulating a broad range of alternatives by:

1. Examining the Forest's capability of providing goods and services in a series of "Benchmarks", or minimum-maximum displays;

2. Projecting the demands for goods and services;

3. Analyzing the potential to resolve issues and concerns; and

4. Determining the need to change management direction.

The results of the AMS form the "Sideboards" or framework within which viable alternatives can be formulated.

The purpose of the benchmark analysis is to:

-Comply with minimum management requirements of 36 CFR 219.27
-Estimate the schedule of management activities resource outputs, effects, discounted benefits and costs and PNV.
-Be approximately implementable.
-Not be constrained by budget.

B. The Minimum Management Requirements are Defined in the NFMA Regulations (36CFR219.27).

A summary listing of these MMR's follows:

1. Conserve soil and water resource productivity.
2. Minimize hazards from natural physical forces such as fire and flood.
3. Prevent or reduce hazards and damage from pest organisms.
4. Protect riparian areas.
5. Maintain or enhance plant and animal diversity.
6. Provide fish and wildlife habitat needed to maintain viable populations.
7. Protect threatened and endangered species habitat.
8. Provide for transportation and utility corridors.
9. Develop road design and construction guidelines and standards.
10. Provide for revegetation of temporary roads.
11. Maintain air quality.
12. Assure that harvested lands can be adequately re-stocked within 5 years.
13. Limit harvest openings to 40 acres maximum.
14. Adhere to multiple use and environmental protection laws (Multiple-Use Sustained Yield Act of 1960 and the National Environmental Policy Act of 1969).

C. Benchmarks Examined

Six benchmarks were developed to define the capability of the Dixie National Forest to produce goods and services, and parameters for determining the range of alternatives. The benchmarks are described in the Analysis of the Management Situation. A summary listing the benchmarks follows:

1. Minimum Level

Specifies the minimum level of management which would be needed to maintain the unit as part of the National Forest System and to manage uncontrollable outputs and uses. This benchmark ignores the transition period that would be required to move from current to minimum level management.

The minimum management level is a hypothetical custodial management situation that displays the naturally occurring, non-induced outputs that are simply the result of the land's existence. The following assumptions and criteria apply.

Assumptions

a. Protect life, health, and safety of Forest users (same for all benchmarks).

b. Administer unavoidable non-Forest Service special uses, including mineral leases and locatable minerals (same for all benchmarks).

c. Protect soil and water resources and prevent significant or permanent impairment of the productivity of Forest land, or land and resources of adjoining lands of other ownership and/or downstream areas (same for all benchmarks).

d. No timber would be harvested.

e. No livestock grazing (except that incidental use associated with dispersed recreation).

f. No developed campsites. Non-induced dispersed recreation would occur.

g. There would be roads on the Forest primarily State and County roads; but also roads built by mining companies and special use permittees.

h. Mineral and outservice activity will increase during the planning period (same for all benchmarks).

i. Land ownership patterns will remain the same as present (same for all benchmarks).

j. There are no Forest Service improvements in place (no costs of obliteration).

k. Population and economic growth of private sector will grow about the same as in the current program (same for all benchmarks).

l. There will be no "basic" Forest Service organization to finance. (The costs of the various activities will add up to the Forest budget.)

D. Resource Outputs, Activities, Costs and Benefits for Benchmarks

The following tables display comparisons of benefits and costs for individual resources. Direct comparisons of benefits and costs displayed for individual resource outputs provide general indications of relationships, but may be misleading because some outputs in multiple use management have common costs of production that cannot easily be separated and attributed to individual resources.

TABLE BIII-1
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR BENCHMARK/MINIMUM LEVEL*

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	92	92	92	92	92		
Rural ROS		92	92	92	92	92		
Road Natural ROS								
Dispersed Recreation Use	MRVD	300	330	360	360	360		
Primitive ROS								
Semi-Primitive		300	330	360	360	360		
Non-Motor ROS								
Semi-Primitive								
Motorized ROS								
Road Natural ROS								
Rural ROS								
Dispersed Recreation Use (Wild.)	MRVD	55	75	90	90	90		
Primitive ROS		55	75	90	90	90		
Semi-Primitive								
Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS							
Structural Habitat Improvement-Aquatic	STRUCTS							
Nonstructural Habitat Improvement-Terrestrial	ACRES							
Nonstructural Habitat Improvement-Aquatic	ACRES							
Wildlife and Fish Use	MWFUD	171	154	138	125	126		
Range								
Grazing Use (Livestock)	MAUM							
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	0	0	0	0	0	0	0
Allowable Sale Quantity	MMBF	0	0	0	0	0	0	0
Sawtimber (Softwood)	MMBF	0	0	0	0	0	0	0
Sawtimber (Hardwood)**	MMBF	0	0	0	0	0	0	0
Roundwood Products	MMBF	0	0	0	0	0	0	0
Fuelwood	MMBF	0	0	0	0	0	0	0
Reforestation	ACRES							
TSI	ACRES							
Water								
Meeting Water Quality Goals	%	98	98	98	98	98		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	0	0	0	0	0		
Increased Yield Over Natural-Colorado River	M AC.FT.	0	0	0	0	0		
Protection								
Fuelbreaks and Fuel Treatment	ACRES							

* Entries in the following tables are on an average annual basis for the decade.

** Aspen could have been displayed as roundwood rather than sawtimber in the following tables. Higher sawtimber merchantability standards were applied to aspen providing conservative volume estimates as were conservative fuelwood benefit values.

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	300	350	310	290	290		
HC&D								
Human Resource Programs	EN.YEARS							
Lands								
Land Pur., Acq., & Exchange	CASES							
Soils								
Soil & Water Resource Imp.	ACRES							
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES							
Local Roads								
Construction	MILES							
Reconstruction	MILES							
Trail Construction/Rconstruction	MILES							
BENEFITS M$ *								
Recreation								
Developed		13	13	13	13	13		
Dispersed		3843	4475	4994	4994	4994		
Wilderness		607	827	993	993	993		
Total		4463	5315	6000	6000	6000		
Range		0	0	0	0	0		
Timber		0	0	0	0	0		
Wildlife		4840	4353	3844	3431	3459		
Water Yield		0	0	0	0	0		
Minerals		1712	1841	1841	1841	1841		
Other		21	21	21	21	21		
Total		11036	11530	11706	11293	11321		
RECEIPTS M$								
Recreation - Developed		13	13	13	13	13		
Range		0	0	0	0	0		
Timber		0	0	0	0	0		
Minerals		5	6	6	5	5		
Other		21	21	21	21	21		
Total		39	40	40	39	39		
COSTS M$								
Timber		0	0	0	0	0		
Roads (Appropriated)		0	0	0	0	0		
Recreation		140	155	170	170	170		
Wildlife		0	0	0	0	0		
Range		0	0	0	0	0		
Protection		190	190	190	190	190		
Other		375	417	424	430	426		
Total Forest Budget		705	762	784	790	786		
O&M		705	762	784	790	786		
Investment		0	0	0	0	0		
Non-Forest Service Costs (Purchaser Const. Roads)		0	0	0	0	0		
Returns to Treasury		39	40	40	39	39		

* Dollar amounts in the following tables are average annual for the decade expressed in 1978 dollars, inflated to 1/1/82.

TABLE BIII-1a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

	DECADE				
BENCHMARK - MINIMUM LEVEL	1	2	3	4	5
Timber	0	0	0	0	0
Costs*	0	0	0	0	0
Benefits	0	0	0	0	0
Net Benefits	0	0	0	0	0
Receipts	0	0	0	0	0
Net Receipts	0	0	0	0	0
Non-Cash Benefits	0	0	0	0	0
Recreation					
Costs	140	155	170	170	170
Benefits	4463	5315	6000	6000	6000
Net Benefits	4323	5160	5830	5830	5830
Receipts	13	13	13	13	13
Net Receipts	-127	-142	157	-157	-157
Non-Cash Benefits	4450	5302	5987	5987	5987
Wildlife					
Costs	0	0	0	0	0
Benefits	4840	4353	3844	3431	3459
Net Benefits	4840	4353	3844	3431	3459
Receipts	0	0	0	0	0
Net Receipts	0	0	0	0	0
Non-Cash Benefits	4840	4353	3844	3431	3459
Range					
Costs	0	0	0	0	0
Benefits	0	0	0	0	0
Net Benefits	0	0	0	0	0
Receipts	0	0	0	0	0
Net Receipts	0	0	0	0	0
Non-Cash Benefits	0	0	0	0	0
Other					
Costs	565	607	614	620	616
Benefits	1733	1862	1862	1862	1862
Net Benefits	1168	1255	1248	1242	1246
Receipts	26	27	27	26	26
Net Receipts	-539	-580	-587	-594	-590
Non-Cash Benefits	1707	1835	1835	1836	1836
Total					
Costs	705	762	784	790	786
Benefits	11036	11530	11706	11293	11321
Net Benefits	10331	10768	10922	10503	10535
Receipts	39	40	40	39	39
Net Receipts	-666	-722	-744	-751	-747
Non-Cash Benefits	10997	11490	11666	11254	11282

* Includes Non-Forest Service Costs (Purchaser Constructed Roads)

No FORPLAN run was made.

Table BIII-1 describes resource outputs, activities, costs, and benefits for the Minimum Level Benchmark.

2. Maximum Present Net Value Based on Established Market Price

Specifies the management which will maximize the present net value of those outputs that have an established market price. These outputs include timber, livestock range forage, developed recreation opportunities, and minerals. Regardless of the price actually paid for these outputs, the full willingness-to-pay value is used.

Assumptions

a. Provide the level of timber, range, developed recreation, and minerals and schedule of costs that maximizes present net value.

b. Constraints are applied only to meet minimum management requirements of 36 CFR 219.27 and timber policy requirements such as non-declining yield.

c. Levels of non-priced outputs will be those that exist in the Minimum Level Benchmark and those induced by activities listed above.

Table BIII-2 describes resource outputs, activities, cost, and benefits for the Maximize PNV (market values) Benchmark.

FORPLAN Objective Function

Maximize present net value (PNV) for 17 periods (170 years).

FORPLAN Constraints

See table BVI-1

3. Maximum Present Net Value Including Assigned Values

Specifies the management which will maximize the present net value of those outputs that have either an established market price or assigned monetary value. Assigned monetary valued outputs include: wildlife-and fish-dependent and other dispersed recreation opportunities and increased water yield.

The purpose of the Maximum PNV (including assigned values) Benchmark is to provide a basis for computing the opportunity costs (net benefits forgone)of the alternatives. The difference between the present net (PNV) value of this benchmark level and the PNV of each alternative is the opportunity cost of that alternative. Present net value trade-off is presented in chapter VIII of Appendix B.

Assumptions

a. Provide the levels of priced outputs, including those with assigned values, that in combination provide the highest possible PNV practicable.

TABLE BIII-2
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR BENCHMARK/MAXIMUM PNV MARKET VALUES

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	474	651	1060	1936	2813		
Rural ROS		261	358	583	1065	1547		
Road Natural ROS		213	298	477	871	1266		
Dispersed Recreation Use	MRVD	659	781	1479	2121	2642		
Primitive ROS								
Semi-Primitive Non-Motor ROS		66	78	148	212	264		
Semi-Primitive Motorized ROS		165	195	370	530	660		
Road Natural ROS		330	391	739	1061	1321		
Rural ROS		99	117	221	318	396		
Dispersed Recreation Use (Wild.)	MRVD	8	10	16	23	28		
Primitive ROS		8	10	16	23	28		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS							
Structural Habitat Improvement-Aquatic	STRUCTS							
Nonstructural Habitat Improvement-Terrestrial	ACRES							
Nonstructural Habitat Improvement-Aquatic	ACRES							
Wildlife and Fish Use	MWFUD	171	154	138	125	126		
Range								
Grazing Use (Livestock)	MAUM	110	107	105	103	100		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	1.1	1.1	2.9	2.9	3.2	3.2	3.2
Allowable Sale Quantity	MMBF	5.0	5.3	17.0	14.3	14.8	15.4	12.1
Sawtimber (Softwood)	MMBF	4.7	4.5	16.6	12.0	9.7	12.6	11.0
Sawtimber (Hardwood)	MMBF	0	0.5	0	1.9	4.7	2.4	0.8
Roundwood Products	MMBF	0.3	0.3	0.4	0.4	0.4	0.4	0.3
Fuelwood	MMBF	1.6	1.6	5.5	5.2	3.7	3.5	3.0
Reforestation	ACRES	26	57	169	107	292	1954	118
TSI	ACRES	0	500	0	45	1062	0	1344
Water								
Meeting Water Quality Goals	%	98	98	98	98	98		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	2.6	1.6	0.9	1.0	1.5		
Increased Yield Over Natural-Colorado River	M AC.FT.	0.5	0.3	0.3	0.6	0.8		
Protection								
Fuelbreaks and Fuel Treatment	ACRES							

	UNIT OF	DECADE						
OUTPUT/ACTIVITY	MEASURE	1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	300	350	310	290	290		
HC&D								
Human Resource Programs	EN.YEARS							
Lands								
Land Pur., Acq., & Exchange	CASES							
Soils								
Soil & Water Resource Imp.	ACRES							
Facilities								
Arterial and Collector Roads								
Construction/Reconstruction	MILES	0	0	0	0	0		
Local Roads								
Construction	MILES	5	2	2	2	2		
Reconstruction	MILES	1	1	1	1	1		
Trail Construction/Rconstruction	MILES							
BENEFITS M$								
Recreation								
Developed		1962	2694	4386	8014	11642		
Dispersed		7176	7741	11184	13171	15348		
Wilderness		91	105	182	253	310		
Total		9229	10540	15752	21438	27300		
Range		887	862	847	830	806		
Timber		369	316	963	982	626		
Wildlife		4840	4353	3844	3431	3459		
Water Yield		152	93	52	58	88		
Minerals		1712	1841	1841	1841	1841		
Other		21	21	21	21	21		
Total		17210	18026	23320	28601	34141		
RECEIPTS M$								
Recreation - Developed		184	247	395	710	1026		
Range		111	108	106	104	101		
Timber		359	306	950	969	613		
Minerals		5	6	6	5	5		
Other		21	21	21	21	21		
Total		680	688	1478	1809	1766		
COSTS M$								
Timber		329	230	293	868	581		
Roads (Appropriated)		57	24	24	24	24		
Recreation		888	970	1374	2535	3527		
Wildlife		67	77	85	103	125		
Range		240	234	229	224	228		
Protection		685	680	334	334	334		
Other		733	749	805	992	853		
Total Forest Budget		2999	2964	3144	5080	5672		
O&M		2567	2624	2398	3094	3071		
Investment		432	340	746	1986	2601		
Non-Forest Service Costs (Purchaser Const. Roads)		34	18	42	94	65		
Returns to Treasury		680	688	1478	1809	1766		

TABLE BIII-2a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

			DECADE		
BENCHMARK - MAXIMUM PNV MARKET	1	2	3	4	5
Timber					
Costs*	363	248	335	962	646
Benefits	369	316	963	982	626
Net Benefits	6	68	628	20	-20
Receipts	359	306	950	969	613
Net Receipts	-4	58	615	7	-33
Non-Cash Benefits	10	10	13	13	13
Recreation					
Costs	888	970	1374	2535	3527
Benefits	9229	10540	15752	21438	27300
Net Benefits	8341	9570	14378	18903	23773
Receipts	184	247	395	710	1026
Net Receipts	-704	-723	-979	-1825	-2501
Non-Cash Benefits	9045	10293	15357	20728	26274
Wildlife					
Costs	67	77	85	103	125
Benefits	4840	4353	3844	3431	3459
Net Benefits	4773	4276	3759	3328	3334
Receipts	0	0	0	0	0
Net Receipts	-67	-77	-85	-103	-125
Non-Cash Benefits	4840	4353	3844	3431	3459
Range					
Costs	240	234	229	224	228
Benefits	887	862	847	830	806
Net Benefits	647	628	618	606	578
Receipts	111	108	106	104	101
Net Receipts	-129	-126	-123	-120	-127
Non-Cash Benefits	776	754	741	726	705
Other					
Costs	1475	1453	1163	1350	1211
Benefits	1885	1955	1914	1920	1950
Net Benefits	410	502	751	570	739
Receipts	26	27	27	26	26
Net Receipts	-1449	-1426	-1136	-1324	-1185
Non-Cash Benefits	1859	1928	1887	1894	1924
Total					
Costs	3033	2982	3186	5174	5737
Benefits	17210	18026	23320	28601	34141
Net Benefits	14177	15044	20134	23427	28404
Receipts	680	688	1478	1809	1766
Net Receipts	-2353	-2294	-1708	-3365	-3971
Non-Cash Benefits	16530	17338	21842	26792	32375

* Includes Non-Forest Service Costs (Purchaser Constructed Roads)

b. Constraints will be applied only to meet minimum management requirements of 36 CFR 219.27 and timber policy requirements such as nondeclining yield.

Table BIII-3 describes resource outputs, activities, cost, and benefits for the maximize PNV (including assigned values) Benchmark.

FORPLAN Objective Function

Maximize PNV for 17 periods.

FORPLAN Constraints

See table BVI-1

4. Current Program Level

Specifies the management most likely to be implemented in the future if current direction is followed. This benchmark is the same as the "No Action" Alternative (Alternative A).

Assumptions

a. Continue the existing developed recreation site capacity and adherence to standards to prevent site deterioration.

b. Accommodate an anticipated increase in dispersed recreation visits and minimize conflicts between users.

c. Improve wildlife habitat, where needed, for selected species.

d. Maintain timber sale offerings as described in the current Timber Management Plan.

e. Maintain and improve watershed conditions and water quality.

f. Manage the suitable rangelands to cost effectively produce forage at a level prescribed by the existing range allotment plans.

g. Process requests from mining industry for leases, permits or licenses within required time frames and coordinate the exploration and development of mineral and energy resources.

h. Meet minimum management requirements of 36 CFR 219.27 and timber policy requirements such as nondeclining yield.

FORPLAN Objective Function

Maximize PNV for 17 periods.

TABLE BIII-3
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR BENCHMARK/MAXIMUM PNV ASSIGNED VALUES

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	474	651	1060	1652	2010		
Rural ROS		261	358	583	909	1105		
Road Natural ROS		213	293	477	743	843		
Dispersed Recreation Use	MRVD	806	1070	1708	2656	3604		
Primitive ROS								
Semi-Primitive Non-Motor ROS		114	151	242	376	510		
Semi-Primitive Motorized ROS		244	324	518	805	1092		
Road Natural ROS		366	486	776	1207	1638		
Rural ROS		81	108	173	268	364		
Dispersed Recreation Use (Wild.)	MRVD	4	7	10	17	25		
Primitive ROS		4	7	10	17	25		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	15	26	32	32	33		
Structural Habitat Improvement-Aquatic	STRUCTS	39	44	33	15	15		
Nonstructural Habitat Improvement-Terrestrial	ACRES	2130	2550	2652	2652	2652		
Nonstructural Habitat Improvement-Aquatic	ACRES	230	230	145	150	150		
Wildlife and Fish Use	MWFUD	170	188	185	184	185		
Range								
Grazing Use (Livestock)	MAUM	110	107	105	103	100		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	1.1	1.1	2.9	2.9	3.2	3.2	3.2
Allowable Sale Quantity	MMBF	5.0	5.3	17.0	14.3	14.8	15.4	12.1
Sawtimber (Softwood)	MMBF	4.7	4.5	16.6	12.0	9.7	12.6	11.0
Sawtimber (Hardwood)	MMBF	0	0.5	0	1.9	4.7	2.4	0.8
Roundwood Products	MMBF	0.3	0.3	0.4	0.4	0.4	0.4	0.3
Fuelwood	MMBF	1.6	1.6	5.5	5.2	3.7	3.5	3.0
Reforestation	ACRES	26	57	169	107	292	1954	118
TSI	ACRES	0	500	0	45	1062	0	1344
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	2.6	1.6	0.9	1.0	1.5		
Increased Yield Over Natural-Colorado River	M AC.FT.	0.5	0.3	0.3	0.6	0.8		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	2183	1193	1456	5535	2401		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	595	660	600	575	565		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES							
Soils								
Soil & Water Resource Imp.	ACRES	51	63	80	63	38		
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES	0	0	0	0	0		
Local Roads								
Construction	MILES	5	2	2	2	2		
Reconstruction	MILES	1	1	1	1	1		
Trail Construction/Rconstruction	MILES							
BENEFITS M$								
Recreation								
Developed		1930	2694	4385	6836	8313		
Dispersed		7651	10016	11796	18542	20088		
Wilderness		90	119	190	297	402		
Total		9671	12829	16371	25675	28803		
Range		887	862	847	830	806		
Timber		369	316	963	982	626		
Wildlife		5644	6284	6203	6178	6203		
Water Yield		152	93	52	58	88		
Minerals		2903	3082	3001	2916	2825		
Other		21	21	21	21	21		
Total		19647	23487	27458	36660	39372		
RECEIPTS M$								
Recreation - Developed		184	247	395	698	737		
Range		111	108	106	104	101		
Timber		359	306	950	969	613		
Minerals		11	12	11	10	10		
Other		21	21	21	21	21		
Total		686	694	1483	1802	1482		
COSTS M$								
Timber		329	230	293	868	581		
Roads (Appropriated)		57	23	24	24	24		
Recreation		726	855	678	689	712		
Wildlife		193	224	233	254	271		
Range		240	234	229	224	228		
Protection		686	684	684	684	688		
Other		1871	2042	2139	2436	2631		
Total Forest Budget		4102	4292	4280	5179	5135		
O&M		3579	3737	3697	4215	4321		
Investment		523	555	583	964	814		
Non-Forest Service Costs (Purchaser Const. Roads)		34	18	42	94	65		
Returns to Treasury		686	694	1483	1802	1482		

TABLE BIII-3a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

BENCHMARK - MAXIMUM PNV ASSIGNED	DECADE 1	2	3	4	5
Timber					
Costs*	363	248	335	962	646
Benefits	369	316	963	982	626
Net Benefits	61	68	628	20	-20
Receipts	359	306	950	969	613
Net Receipts	-4	58	615	7	-33
Non-Cash Benefits	10	10	13	13	13
Recreation					
Costs	726	855	678	689	712
Benefits	9671	12829	16371	25675	28803
Net Benefits	8945	11974	15693	24986	28091
Receipts	184	247	395	698	737
Net Receipts	-542	608	-283	9	25
Non-Cash Benefits	9487	12582	15976	24977	28066
Wildlife					
Costs	193	224	233	254	271
Benefits	5644	6284	6203	6178	6203
Net Benefits	5451	6060	5970	5924	5932
Receipts	0	0	0	0	0
Net Receipts	-193	-224	-233	-254	-271
Non-Cash Benefits	5644	6284	6203	6178	6203
Range					
Costs	240	234	229	224	228
Benefits	887	862	847	830	806
Net Benefits	647	628	618	606	578
Receipts	111	108	106	104	101
Net Receipts	-129	-126	-123	-120	-127
Non-Cash Benefits	776	754	741	726	705
Other					
Costs	2614	2749	2847	3144	3343
Benefits	3076	3196	3074	2995	2934
Net Benefits	462	447	227	-149	-409
Receipts	32	33	32	31	31
Net Receipts	-2582	-2716	-2815	-3113	-3312
Non-Cash Benefits	3044	3163	3042	2964	2903
Total					
Costs	4136	4310	4322	5273	5200
Benefits	19647	23487	27458	36660	39372
Net Benefits	15511	19177	23136	31387	34172
Receipts	686	694	1483	1802	1482
Net Receipts	-3450	-3616	0	-3471	-3718
Non-Cash Benefits	18961	22793	25975	34858	37890

* Includes Non-Forest Service Costs (Purchaser Constructed Roads)

TABLE BIII-4
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR BENCHMARK/CURRENT PROGRAM

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	466	641	958	1275	1106		
Rural ROS		186	256	383	510	804		
Road Natural ROS		280	385	575	765	302		
Dispersed Recreation Use	MRVD	780	1056	1693	2641	3391		
Primitive ROS								
Semi-Primitive Non-Motor ROS	MRVD	110	149	239	373	508		
Semi-Primitive Motorized ROS	MRVD	236	320	513	800	1088		
Road Natural ROS		355	480	769	1201	1634		
Rural ROS		79	107	171	267	363		
Dispersed Recreation Use (Wild.)	MRVD	8	11	17	27	36		
Primitive ROS		8	11	17	27	36		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	10	12	12	12	12		
Structural Habitat Improvement-Aquatic	STRUCTS	20	25	25	25	25		
Nonstructural Habitat Improvement-Terrestrial	ACRES	850	840	840	820	820		
Nonstructural Habitat Improvement-Aquatic	ACRES	100	110	110	130	130		
Wildlife and Fish Use	MWFUD	171	183	182	180	179		
Range								
Grazing Use (Livestock)	MAUM	115	115	115	115	115		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	5.1	5.2	5.3	5.3	5.4	5.4	5.4
Allowable Sale Quantity	MMBF	26.4	26.0	26.3	26.4	26.4	22.5	24.4
Sawtimber (Softwood)	MMBF	22.9	15.7	14.9	17.4	21.3	19.5	20.5
Sawtimber (Hardwood)	MMBF	2.8	9.4	10.3	7.8	3.7	1.9	2.7
Roundwood Products	MMBF	0.7	0.9	1.1	1.2	1.4	1.1	1.2
Fuelwood	MMBF	10.7	8.4	8.5	8.0	9.4	8.0	8.1
Reforestation	ACRES	1588	402	454	3353	1646	1382	921
TSI	ACRES	5000	54	1769	628	250	119	0
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	4.3	8.3	8.1	6.7	6.0		
Increased Yield Over Natural-Colorado River	M AC.FT.	1.2	2.7	2.6	2.1	1.9		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	10505	7117	4641	5133	4919		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Mineral Leases and Permits	CASES	690	730	750	750	780		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES	2	2	2	2	2		
Soils								
Soil & Water Resource Imp.	ACRES	51	63	80	63	38		
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	28	18	15	11	7		
Reconstruction	MILES	32	34	21	22	22		
Trail Construction/Rconstruction	MILES	0	0	0	0	0		
BENEFITS M$								
Recreation								
Developed		1929	2654	3966	5279	8754		
Dispersed		6917	8287	10865	14769	18709		
Wilderness		90	121	191	297	403		
Total		8936	11062	15022	20345	27866		
Range		927	927	927	927	927		
Timber		1211	1257	964	512	740		
Wildlife		5551	5649	5680	5710	5741		
Water Yield		251	485	473	391	350		
Minerals		2884	3081	3038	2899	2828		
Other		21	21	21	21	21		
Total		19781	22482	26125	30805	38473		
RECEIPTS M$								
Recreation - Developed		181	244	358	472	411		
Range		116	116	116	116	116		
Timber		1198	124	951	499	727		
Minerals		12	13	14	14	14		
Other		21	21	21	21	21		
Total		1528	1638	1460	1122	1289		
COSTS M$								
Timber		2500	1327	1071	1981	1314		
Roads (Appropriated)		48	24	24	24	24		
Recreation		640	743	733	832	653		
Wildlife		119	131	139	136	141		
Range		380	380	386	382	389		
Protection		226	335	335	335	335		
Other		2310	2309	2326	2346	2331		
Total Forest Budget		6223	5249	5014	6036	5187		
O&M		3892	3971	3902	4037	3831		
Investment		2331	1278	1112	1999	1356		
Non-Forest Service Costs (Purchaser Const. Roads)		239	170	118	100	64		
Returns to Treasury		1528	1638	1460	1122	1289		

TABLE BIII-4a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

BENCHMARK - CURRENT PROGRAM	DECADE 1	2	3	4	5
Timber					
Costs*	2739	1497	1189	2081	1378
Benefits	1211	1257	964	512	740
Net Benefits	-1528	-240	-225	-1569	-638
Receipts	1198	1244	951	499	727
Net Receipts	-1541	-253	-238	-1582	-651
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	640	743	733	832	653
Benefits	8936	11062	15022	20345	27866
Net Benefits	8296	10319	14289	19513	27213
Receipts	181	244	358	472	411
Net Receipts	-459	-499	-375	-360	-242
Non-Cash Benefits	8755	10818	14664	19873	27455
Wildlife					
Costs	119	131	139	136	141
Benefits	5551	5649	5680	5710	5741
Net Benefits	5432	5518	5541	5574	5600
Receipts	0	0	0	0	0
Net Receipts	-119	-131	-139	-136	-141
Non-Cash Benefits	5551	5649	5680	5710	5741
Range					
Costs	380	380	386	382	389
Benefits	927	927	927	927	927
Net Benefits	547	547	541	545	538
Receipts	116	116	116	116	116
Net Receipts	-264	-264	-270	-266	-273
Non-Cash Benefits	811	811	811	811	811
Other					
Costs	2584	2668	2685	2705	2690
Benefits	3156	3587	3532	3311	3199
Net Benefits	572	919	847	606	5094
Receipts	33	34	35	35	35
Net Receipts	-2551	-2634	-2650	-2670	-2655
Non-Cash Benefits	3123	3553	3497	3276	3164
Total					
Costs	6462	5419	5132	6136	5251
Benefits	19781	222482	26125	30805	38473
Net Benefits	13319	17063	20993	24669	33222
Receipts	1528	1638	1460	1122	1289
Net Receipts	-4934	-3781	-3671	-5014	-3962
Non-Cash Benefits	18253	20844	24665	29683	37184

* Includes Non-Forest Service Costs (Purchaser Constructed Roads)

FORPLAN Constraints

See table BVI-1.

Table BIII-4 describes resource outputs, activities, costs, and benefits for the Current Program Level Benchmark.

5. Maximize Timber Resource

Timber management is emphasized within the constraints of the minimum standards of laws and without impairment of productivity. Reasonable biological potential is developed and is not constrained by budgets. Other resource outputs are held at current levels unless affected by the timber resource.

Maximize Timber Scenario

A timber harvest level that will reflect the full biological potential of timbered areas to produce wood products constrained by the protection of soil and water resources, maintenance of minimum viable wildlife populations, protection of T&E species habitat, and protection of cultural resources.

Assumptions

a. Timber would be harvested from all available and tentatively suitable timber lands.

b. Budget is not a constraint.

c. There will be a demand and the mill capacity to handle all timber offered for sale.

d. Logging systems that would be used include tractor, short and long span cable, and helicopter.

e. Visuals and aesthetic quality will not be provided for.

f. Soil and watershed rehabilitation activities will need to be increased.

g. FA&O facilities would be increased to support timber activities as necessary.

h. Recreation will shift from dispersed to developed categories.

i. All other current laws, multiple use constraints, and resource activities would continue at the current level on non-commercial timbered areas and other non-timbered areas.

j. Timber policy constraints such as nondeclining yield will apply.

FORPLAN Objective Function

Maximize sawtimber production for 1 period.

TABLE BIII-5
RESOURCE OUTPUTS, ACTIVITIES, COSTS
AND BENEFITS FOR BENCHMARK/MAXIMUM TIMBER

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	526	740	757	757	757		
Rural ROS		306	429	439	439	439		
Road Natural ROS		222	311	318	318	318		
Dispersed Recreation Use	MRVD	943	1177	1435	1750	3883		
Primitive ROS								
Semi-Primitive Non-Motor ROS		136	166	203	247	302		
Semi-Primitive Motorized ROS		290	357	435	530	646		
Road Natural ROS		435	535	652	795	970		
Rural ROS		82	119	144	177	216		
Dispersed Recreation Use (Wild.)	MRVD	43	43	43	43	43		
Primitive ROS		43	43	43	43	43		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	9	10	10	10	11		
Structural Habitat Improvement-Aquatic	STRUCTS	20	29	19	11	11		
Nonstructural Habitat Improvement-Terrestrial	ACRES	630	658	696	621	621		
Nonstructural Habitat Improvement-Aquatic	ACRES	210	220	232	207	207		
Wildlife and Fish Use	MWFUD	170	172	168	167	167		
Range								
Grazing Use (Livestock)	MAUM	117	117	117	117	117		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	6.1	6.2	6.2	6.2	6.3	6.3	6.3
Allowable Sale Quantity	MMBF	31.2	31.3	34.0	31.5	31.2	26.2	29.1
Sawtimber (Softwood)	MMBF	27.7	14.3	31.1	21.2	24.3	20.0	22.2
Sawtimber (Hardwood)	MMBF	2.7	16.0	1.8	9.1	5.6	5.2	5.7
Roundwood Products	MMBF	0.8	1.0	1.1	1.2	1.3	1.0	1.2
Fuelwood	MMBF	7.5	4.7	5.7	7.5	9.2	7.5	8.5
Reforestation	ACRES	1199	403	839	4154	2199	2682	808
TSI	ACRES	2629	610	1848	538	0	1735	228
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	3.5	7.9	7.5	7.3	8.3		
Increased Yield Over Natural-Colorado River	M AC.FT.	0.7	2.2	2.3	2.5	2.6		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	9842	6109	6359	6489	5802		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	786	839	779	774	774		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES	0	2	2	2	1		
Soils								
Soil & Water Resource Imp.	ACRES	46	58	58	58	33		
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	17	27	24	9	5		
Reconstruction	MILES	40	27	16	26	28		
Trail Construction/Rconstruction	MILES	7	7	7	7	7		
BENEFITS M$								
Recreation								
Developed		1865	2624	2684	2684	2684		
Dispersed		7305	8250	11114	11274	19802		
Wilderness		408	408	408	408	408		
Total		9578	11282	14206	14366	22894		
Range		943	943	943	943	943		
Timber		1582	906	1342	-36	723		
Wildlife		5631	5711	5623	5588	5604		
Water Yield		204	461	438	426	485		
Minerals		2914	3069	3026	2904	2813		
Other		21	21	21	21	21		
Total		20873	22393	25599	24212	33483		
RECEIPTS M$								
Recreation - Developed		202	279	286	286	286		
Range		118	118	118	118	118		
Timber		1569	893	1329	0	710		
Minerals		14	15	14	14	14		
Other		21	21	21	21	21		
Total		1924	1326	1768	439	1149		
COSTS M$								
Timber		1938	1549	1235	2496	1562		
Roads (Appropriated)		24	24	24	24	24		
Recreation		882	963	1368	2529	3539		
Wildlife		144	147	144	148	147		
Range		530	557	571	578	594		
Protection		690	684	679	684	682		
Other		2441	2557	2584	2982	3079		
Total Forest Budget		6649	6481	6605	9441	9627		
O&M		4852	4954	4930	6052	6099		
Investment		1797	1527	1675	3389	3528		
Non-Forest Service Costs (Purchaser Const. Roads)		168	212	150	127	67		
Returns to Treasury		1924	1326	1768	390	1149		

TABLE BIII-5a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

	DECADE				
BENCHMARK - MAXIMUM TIMBER	1	2	3	4	5
Timber					
Costs*	2106	1761	1385	2623	1629
Benefits	1582	906	1342	-36	723
Net Benefits	-524	-855	-43	-2659	-906
Receipts	1569	893	1329	0	710
Net Receipts	-537	-868	-56	-2623	-919
Non-Cash Benefits	13	13	13	0	13
Recreation					
Costs	882	963	1368	2529	3539
Benefits	9578	11282	14206	14366	22894
Net Benefits	8696	10319	12838	11837	19355
Receipts	202	279	286	286	286
Net Receipts	-680	-684	-1082	-2243	-3253
Non-Cash Benefits	9376	11003	13920	14080	22608
Wildlife					
Costs	144	147	144	148	147
Benefits	5631	5711	5623	5588	5604
Net Benefits	5487	5564	5479	5440	5457
Receipts	0	0	0	0	0
Net Receipts	-144	-147	-144	-148	-147
Non-Cash Benefits	5631	5711	5623	5588	5604
Range					
Costs	530	557	571	578	594
Benefits	943	943	943	943	943
Net Benefits	413	386	372	365	349
Receipts	118	118	118	118	118
Net Receipts	-412	-439	-453	-460	-476
Non-Cash Benefits	825	825	825	825	825
Other					
Costs	3155	2649	3287	3690	3785
Benefits	3139	3551	3485	3351	3319
Net Benefits	-16	902	198	-339	-466
Receipts	36	36	35	35	35
Net Receipts	-3120	-2613	-3252	-3655	-3750
Non-Cash Benefits	3104	3515	3450	3316	3284
Total					
Costs	6817	6077	6755	9568	9694
Benefits	20873	22393	25599	24212	33483
Net Benefits	14056	16316	18844	14644	23789
Receipts	1924	1326	1768	439	1149
Net Receipts	-4893	-4751	-4987	-9129	-8545
Non-Cash Benefits	18949	21067	23831	23773	32334

* Includes Non-Forest Service Costs (Purchaser Constructed Roads)

FORPLAN Constraints

See table BVI-1.

Table BIII-5 describes resource outputs, activities, cost, and benefits for the Current Program Level Benchmark.

6. Maximum Range Benchmark

The Maximum Range Benchmark is a hypothetical management situation that provides for maximum possible range forage production and utilization by domestic livestock. This level is constrained by the legal requirements to protect soil and water resources, to maintain minimum viable wildlife populations, to protect threatened and endangered species habitat, and to protect cultural resources.

Assumptions

a. There would be no wilderness, research natural, or primitive areas on the Forest in which range improvement work could not be done.

b. Developed recreation areas would not be excluded from grazing. These areas could still be used by recreationists; however, they would have to live with the livestock.

c. All water sources would be available for the use of livestock, to the extent that water quality did not go below minimum standards. Recreation activities would only be allowed if they did not interfere with free access to the water by livestock.

d. Timber harvesting that would result in increased livestock forage production would be emphasized. Areas which provide high quality transitory range will be harvested on a schedule to maintain optimum forage production.

All of the suitable range area would be treated over a 40 year period. After the initial cut, reentry would be made very 20 years to keep the stand thinned to a growing stock level of 40 square feet which would maintain forage production.

e. In general, there would be no type conversions of timbered lands for forage production purposes, however, regeneration areas would not be excluded from livestock use.

f. It is assumed that grazing permittees could and would procure all the livestock necessary to fully utilize all forage produced.

g. Visual quality objectives would not be provided for.

h. Budget for range improvement is not a constraint.

i. The Forest road and trail system will remain about the same (miles), however, many local roads will need upgrading to improve access for permittees.

j. All areas that are presently being grazed (685,793 acres) will continue to be grazed. In addition, approximately *6,500 acres of campgrounds, summer home areas, and other areas currently closed to grazing will be opened to grazing.

k. As a general rule, forage utilization will not exceed 50%.

FORPLAN Objective Function

Maximize PNV for 17 periods.

FORPLAN Constraints

1. Harvest using range emphasis all potential transitory range over a 40 year period.

2. See table BVI-1.

Table BIII-6 describes resource outputs, activities, costs, and benefits for the Maximum Range Benchmark.

*Estimated 1,500 acres of recreational developments and 5,000 acres of timber plantation areas.

TABLE BIII-6
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR BENCHMARK/MAXIMUM RANGE

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	526	653	538	538	538		
Rural ROS		306	429	312	312	312		
Road Natural ROS		222	224	226	226	226		
Dispersed Recreation Use	MRVD	827	1106	1705	2618	4033		
Primitive ROS								
Semi-Primitive Non-Motor ROS		41	55	85	131	202		
Semi-Primitive Motorized ROS		83	111	170	262	403		
Road Natural ROS		579	774	1193	1832	2823		
Rural ROS		124	166	255	393	605		
Dispersed Recreation Use (Wild.)	MRVD	4	4	4	4	4		
Primitive ROS		4	4	4	4	4		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	14	12	9	8	6		
Structural Habitat Improvement-Aquatic	STRUCTS	7	7	7	7	7		
Nonstructural Habitat Improvement-Terrestrial	ACRES	400	400	400	400	400		
Nonstructural Habitat Improvement-Aquatic	ACRES	75	71	64	64	58		
Wildlife and Fish Use	MWFUD	165	112	84	67	58		
Range								
Grazing Use (Livestock)	MAUM	119	124	130	137	143		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	4.0	3.2	3.4	5.6	2.7	3.1	4.3
Allowable Sale Quantity	MMBF	20.0	16.5	17.1	23.7	14.5	13.7	22.1
Sawtimber (Softwood)	MMBF	12.2	10.3	10.5	16.9	13.0	12.8	18.4
Sawtimber (Hardwood)	MMBF	7.0	5.8	5.8	6.0	0.7	0.1	2.7
Roundwood Products	MMBF	0.8	0.4	0.8	0.8	0.8	0.8	1.0
Fuelwood	MMBF	10.1	7.2	6.8	7.7	8.7	7.5	8.5
Reforestation	ACRES	153	159	143	306	614	2831	904
TSI	ACRES	1536	74	294	1107	450	0	2520
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	4.1	4.1	3.3	3.2	3.0		
Increased Yield Over Natural-Colorado River	M AC.FT.	1.1	1.4	1.2	1.4	1.3		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	7957	7717	6954	4471	5342		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	786	839	779	774	744		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES							
Soils								
Soil & Water Resource Imp.	ACRES	46	58	58	58	33		
Facilities								
Arterial and Collector Roads								
Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	17	27	24	9	5		
Reconstruction	MILES	40	27	16	26	28		
Trail Construction/Rconstruction	MILES	7	7	7	7	7		
BENEFITS M$								
Recreation								
Developed		2176	2702	2227	2227	2227		
Dispersed		9033	9629	12515	17911	18215		
Wilderness		48	48	48	48	48		
Total		11257	12379	14790	20186	20490		
Range		959	998	1047	1104	1153		
Timber		907	708	756	1066	831		
Wildlife		4707	3115	2230	1695	1387		
Water Yield		239	239	193	187	175		
Minerals		2914	3069	3026	2904	2813		
Other		21	21	21	21	21		
Total		21004	20529	22063	27163	26870		
RECEIPTS M$								
Recreation - Developed		202	248	207	207	207		
Range		120	125	131	138	144		
Timber		894	695	743	1053	818		
Minerals		14	15	14	14	13		
Other		21	21	21	21	21		
Total		2151	1104	1116	1433	1203		
COSTS M$								
Timber		952	648	631	903	833		
Roads (Appropriated)		48	29	0	24	24		
Recreation		449	449	563	587	691		
Wildlife		70	70	68	68	72		
Range		693	756	775	575	596		
Protection		670	670	670	670	670		
Other		1121	1279	1231	1477	1478		
Total Forest Budget		4003	3901	3938	4304	4364		
O&M		2817	2926	2983	3267	3299		
Investment		1186	975	955	1037	1065		
Non-Forest Service Costs (Purchaser Const. Roads)		118	88	82	117	77		
Returns to Treasury		1251	1104	1116	1433	1203		

TABLE BIII-6a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

	DECADE				
BENCHMARK - MAXIMUM RANGE	1	2	3	4	5
Timber					
Costs*	1070	736	713	1020	910
Benefits	907	708	756	1066	831
Net Benefits	-163	-28	43	46	-79
Receipts	894	695	743	1053	818
Net Receipts	-176	-41	30	33	-92
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	449	449	563	587	691
Benefits	11257	12379	14227	19599	20490
Net Benefits	10808	11930	14227	19599	19799
Receipts	202	248	207	207	207
Net Receipts	-247	-201	-356	-380	-484
Non-Cash Benefits	11055	12131	14583	19979	20283
Wildlife					
Costs	70	70	68	68	72
Benefits	4707	3115	2230	1695	1387
Net Benefits	4637	3045	2162	1627	1315
Receipts	0	0	0	0	0
Net Receipts	-70	-70	-68	-68	-72
Non-Cash Benefits	4707	3115	2230	1695	1387
Range					
Costs	693	756	775	575	596
Benefits	959	998	1047	1104	1153
Net Benefits	266	242	272	529	557
Receipts	120	125	131	138	144
Net Receipts	-573	-631	-644	-437	-452
Non-Cash Benefits	589	442	484	746	539
Other					
Costs	1839	1978	1901	2171	2172
Benefits	3174	3329	3240	3112	3009
Net Benefits	1335	1351	1339	941	837
Receipts	35	36	35	35	34
Net Receipts	-1804	-1942	-1866	-2136	-2138
Non-Cash Benefits	3139	3293	3205	3077	2975
Total					
Costs	4121	3989	4020	4421	4441
Benefits	21004	20529	22063	27163	26870
Net Benefits	16833	16540	18043	22742	22429
Receipts	1251	1104	1116	1433	1203
Net Receipts	-2870	-2885	-2904	-2988	-3238
Non-Cash Benefits	19503	18994	20515	25510	25197

* Includes Non-Forest Service Costs (Purchaser Constructed Roads)

IV. GENERATING AN ARRAY OF ALTERNATIVES

The generation of alternatives which were broad enough in scope to describe the most reasonable choices for managing the Forest followed the analysis of the management situation (AMS).

The public issues and management concerns were consolidated into a set of planning issues. Alternatives were then formulated that provided different emphases for resolving the planning issue. Prescriptions were developed and guided by the alternative emphasis were applied to units of land management areas.

A Forest plan alternative is a mix of management prescriptions applied in specific amounts and locations to achieve a desired management goal and objectives. According to NFMA (36 CFR 219.12f) alternatives must:

-Be within the maximum and minimum resource potential of the Forest to provide a full range of resource outputs and expenditure levels (timber harvest departure schedules could briefly exceed maximum potential growth).

-Be formulated to facilitate analysis of opportunity costs, resource use, and environmental tradeoffs among alternatives.

-Be formulated to facilitate evaluation of present net value, benefits, and costs of achieving various outputs and nonpriced benefits.

-Address and respond differently to major public issues, management concerns, and resource opportunities.

-Represent the most cost-efficient combination of management prescriptions to meet the objectives of the alternative.

-State the condition and uses that will result from long-term implementation.

-State what goods and services will be produced, including timing and flow of outputs, and the costs and benefits generated.

-State the resource management standards and guidelines.

-State the purposes of the proposed management direction.

V. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

All of the benchmarks except Min. Level were evaluated as alternatives, but not considered in detail. The benchmarks are typically single resource oriented and do not contain multiple use constraints and mitigation measures.

Four other alternatives were considered, but rejected. Passage of the Utah Wilderness Act of 1984 eliminated the need for:

Maximum Wilderness
Minimum Wilderness

The purpose of these alternatives was principally to have a wide range of wilderness options.

As the analysis results began to define the opportunities on the Forest it became obvious that two market emphasis alternatives were redundant. One market alternative and a departure which included helicopter and longspan cable logging areas. The other market alternative was similar except it did not have a departure or aerial logging areas. The two were combined into one alternative called simply: Market Emphasis. Helicopter and longspan cable logging areas were retained to display outputs and costs of including the steep slope areas.

A departure alternative for the composite alternative was not considered in detail for these reasons:

1. Other alternatives considered in detail necessitated relaxing the non-declining yield constraint (RPA80, High Productivity).

2. Departure analysis on the Composite Alternative revealed that long term productivity was not enhanced by departing from non-declining yield. This emphasizes that the Forest is not an old growth surplus Forest where a classical departure is most meaningful.

3. A departure for the Composite Alternative causes a greater decrease of softwood sawtimber production in the second decade than if a departure wasn't considered. This would ensure that one or more of the existing sawmills served by the Forest would face substantial hardship, based on their current product needs.

4. All alternatives and benchmarks modeled force large volumes of hardwood timber into solution beyond the first decade whether non-declining yield or upper and lower bounds between which harvest may fluctuate are specified. Currently there is a small market for this material on the Forest.

5. A departure would increase the potential of below cost timber sales.

An alternative addressing even-aged and uneven-aged management was considered but rejected because silvicultural systems are dictated by tree species and site specific conditions. Adequate guidelines outlining acceptable silvicultural systems given various management objectives are presented in the Forest's standards and guidelines. Even-aged management is the preferred silvicultural system for Douglas-fir, ponderosa pine and aspen because of the silvicultural characteristics of these species. Shelterwood systems (even-aged management) provide site protection by leaving residual tree cover while awaiting regeneration to fully occupy the site.

The need for retaining mature stands of trees throughout the Forest is satisfied through constraints and on the land base not suited for timber production. This satisfies most resource needs. The Engelmann spruce-subalpine fir type is the best suited for uneven-aged management on the Forest. Economic considerations and disease conditions such as the presence of root rot and the risk of its spread may limit the desirability of uneven-aged management in some cases. Shelterwoods systems or very small clearcuts (> to 1 acre) may be preferred methods under these conditions. These methods also provide some of the benefits of a selection system, sites continuously occupied by trees. Thus, each alternative neither promotes or discourages uneven-aged or even-aged management. The decision of which silvicultural systems to use will be made on a site specific basis, where it best addresses stands conditions and the needs of all resources.

The following displays the comparison between the departure and the base sale schedule of the Composite Alternative B (proposed).

	Volume - MMBF/Year Period 1	2	3	4	5
Alternative B					
Hardwood Component	3.5	10.3	11.4	9.0	5.1
Softwood Component	22.9	15.7	14.9	17.4	21.3
Departure					
Hardwood Component	5.3	29.0	6.9	1.7	.7
Softwood Component	39.6	11.6	18.2	16.6	13.1

	Volume - MMCF/Year Period 1	2	3	4	5
Alternative B.	5.1	5.2	5.3	5.3	5.4
Departure	8.5	6.4	4.8	3.6	2.7

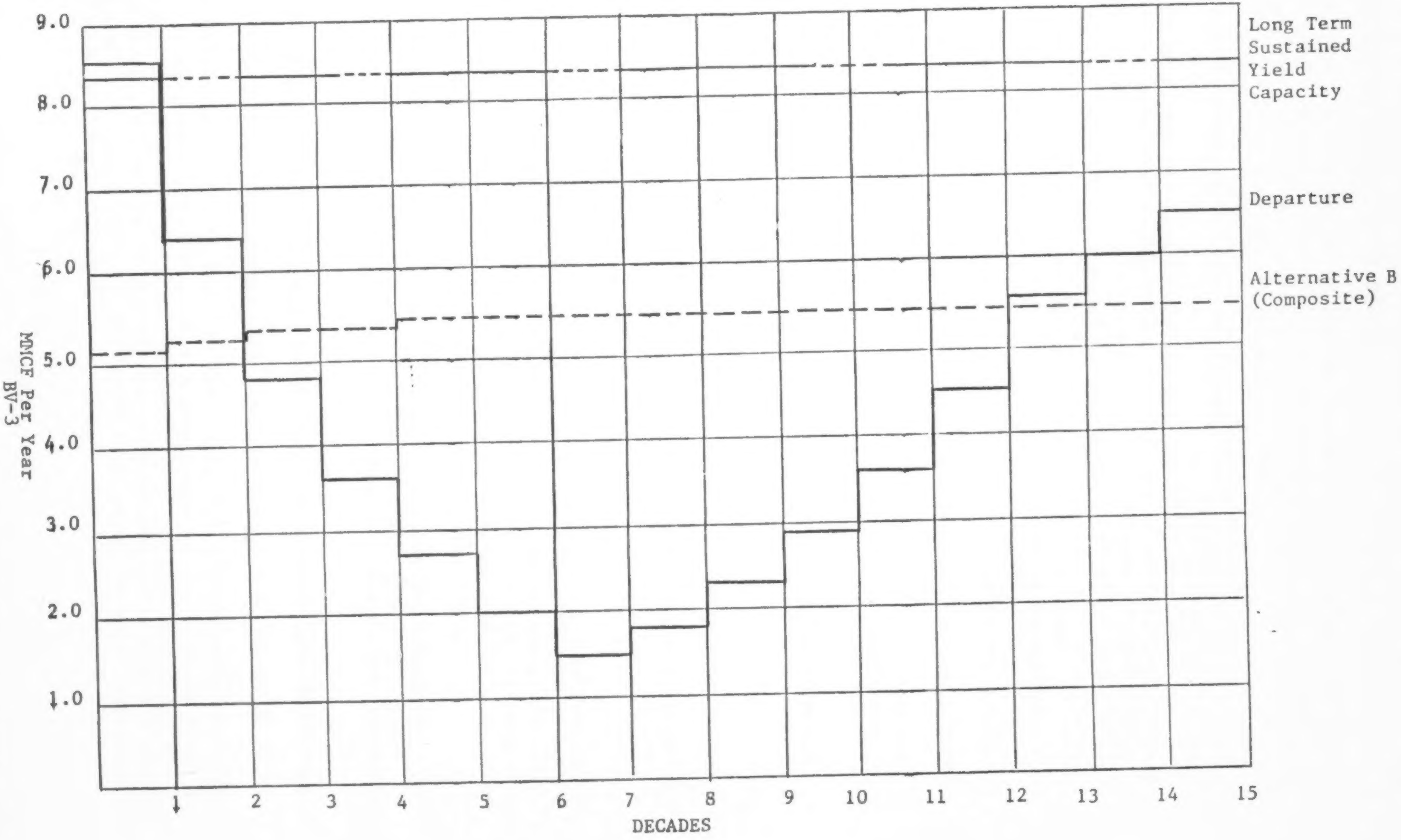
	Total Acres Harvested Per Year Period 1	2	3	4	5
Alternative B	10525	8815	5809	5823	4919
Departure	17087	8235	6334	5290	4436

	Alternative B	Departure
LTSYC - MCF/Year	8.205	7.411
FORPLAN PNV -M$*	-14883	-23468

*Discounted timber benefits minus production costs (4 percent discount rate over 50 years). Excludes general administration.

A graphical display of the timber harvest schedules for the entire 150 year planning horizon is found in Figure BV-1.

FIGURE BV-1
COMPARISON OF BASE SALE SCHEDULE OF PROPOSED ALTERNATIVE
WITH DEPARTURE HARVEST SCHEDULE
ANNUAL HARVEST OVER PLANNING HORIZON



VI. ALTERNATIVES CONSIDERED IN DETAIL

A Forest Plan alternative can be defined as the mix of management activities and practices (prescriptions) needed to achieve a given set of management goals and objectives. It is specific as to amounts, time scheduling, and location within the limits of non-contiguous analysis areas.

As defined in 36 CFR 219.12 f, alternatives:

-Shall be within the land capability for the Forest to produce.
-Shall be formulated to facilitate the analysis of trade-offs in resource use, opportunity costs, and environmental effects between alternatives.
-Shall be formulated to facilitate the evaluation of the effects on benefits, costs and present net value.
-Shall provide a variety of responses to issues and concerns.
-Shall represent the most cost efficient combination of management prescriptions to meet the specific alternative's objectives.
-Shall state the condition, uses, goods and services produced, timing and flow of outputs, and associated costs and benefits.
-Shall state the alternative objective and the standards and guidelines proposed.
-At least one alternative shall reflect the current level of goods and services produced by the unit as projected over time. This alternative shall be considered the "No Action" alternative pursuant to NEPA procedures.

The Forest has supplemented the above direction by the addition of several alternative development criteria. These are:

To be viable, an alternative:

-Must meet all MMR constraints
-Should meet budget limitations specified in the R-4 LMP Checklist dated 2/13/84, unless it is a departure.
-Must not violate water quality standards.

Ten alternatives were formulated in response to issues and concerns expressed by the public and Forest managers, and in response to legal requirements. Passage of the Utah Wilderness BIll eliminated the need for two wilderness alternatives and upon analysis one market emphasis alternative was dropped from further consideration. Seven alternatives were explored in detail, and a new eighth alternative, the Composite Alternative, was developed.

This section is in two parts. The first part describes the constraints common to all alternatives, and the second part describes the overall goals and objectives, the assumptions and constraints specific to each alternative, and the resulting activities and outputs.

A. Table BVI-1 Lists constraints common to all alternatives and benchmarks.

B. Resource Outputs, Activities, Costs and Benefits for Alternatives

Tables BVI-2 through BVI-9a which follow display comparisons of benefits and costs for individual resources. Direct comparisons of benefits and costs displayed for individual resource outputs provide general indications of relationships, but may be misleading because some outputs in multiple use management have common costs of production that cannot be easily separated and attributed to individual resources.

TABLE BVI-1
CONSTRAINTS, ASSUMPTIONS USED FOR FOREST PLANNING BENCHMARKS AND ALTERNATIVES
(Applied to FORPLAN)

BENCHMARK/ ALTERNATIVE	RATIONALE/REMARKS	CONSTRAINED RESOURCE/ CONSTRAINT #	CONSTRNT (C) ASSUMP. (A)	TYPE OF CONSTRAINT/ ASSUMPTION	TIME PERIOD APPLIED	AMOUNT OF CON-STRAINT/ ASSUMP.	KIND OF* CONSTRAINT/ ASSUMPTION	DOCUMENTATION SOURCE
All Benchmarks and Alternatives	To meet Minimum Management Requirements (MMR's) of 36CFR 219.27. Delete acres from available, capable, and suitable commercial forest land where irreversible resource damage may occur due to timber harvest.	Timber/#1	C	Reduce acres available to FORPLAN	All periods	81,062 acres	M	AMS - Timber Suitability Page II-23.
	To meet MMR's of 36 CFR 219.27. Reduce acres equivalent to a volume reduction for protection of water quality to meet state standards. These areas are in non riparian drainage bottoms.	Timber/#2	C	Reduce acres	All periods	460 acres	M	Soil Scientist Memo 1/7/85.
	To meet MMR's of 36 CFR 219.27. The acreage figure represents a reduced harvest level on riparian protection zones, equal to an 80% reduction in volume on a typical acre of a particular analysis area.	Timber/#3	C	Reduce acres	All periods	1,759 acres	M	Hydrologist Memo 1/8/85.
	To meet MMR's of 36 CFR 219.27. Limit timber harvest within 30 year periods in the East Fork of the Sevier River drainages to prevent exceeding critical water yield thresholds.	Timber/#4	C	Water Yield Increase Allowed	1st Period 2nd Period 3rd + Periods	1612 Ac Ft 1844 Ac Ft 1913 Ac Ft	M	Hydrologist Memo 11/84.
	To meet MMR's of 36 CFR 219.27. Limit timber harvest (all commercial entries) in certain analysis areas to prevent excessive cumulative watershed impacts from sedimentation.	Timber/#5	C	Limit Acres Harvested in an analysis area, in a given period.	Periods 1-5	Varies from limiting harvest from 25% to 90% of a given analysis area per decade.	M	Hydrologist Memo 11/84.

*Kind of constraint
M - Minimum Management Requirement (36 CFR 219.27)
P - General Timber Policy Constraint
T - Constraint Necessary for Technical Implementability
D- Discretionary Constraint

BENCHMARK/ ALTERNATIVE	RATIONALE/REMARKS	CONSTRAINED RESOURCE/ CONSTRAINT #	CONSTRNT (C)/ ASSUMP. (A)	TYPE OF CONSTRAINT/ ASSUMPTION	TIME PERIOD APPLIED	AMOUNT OF CONSTRAINT/ ASSUMP.	KIND OF* CONSTRAINT/ ASSUMPTION	DOCUMENTATION SOURCE
All Benchmarks and Alternatives	To meet MMR's of 36 CFR 219.27. Reduction in acreage equivalent to volume reduction for maintaining minimum viable populations of old growth dependent species and to meet diversity requirements. Constraints #1, #2, #3, and non commercial old growth contribute to satisfying these requirements.	Timber/#6	C	Reduce acres	All periods	6,298 ac. of suitable timber	M	Wildlife biologist Memo 1/7/85.
	Require cable (24,559 acres) or helicopter/logspan cable (31,829 acres) logging methods on slopes greater than 40%.	Timber/#7	A	Logging Method	all periods	56,388 acres	T	Mapped Commercial Forest land with slopes greater than 40%.
	To meet MMR's of 36 CFR 219.27. Ensure restocking of harvested lands within 5 years of final harvest. Adequate costs to meet this requirement are included in the FORPLAN model. Costs vary because of site requirements.	Timber/#8	A	Ensure adequate costs	All periods	All Suitable forest land.	M	Documentation by Forest Silviculturlist. Analysis area maps. FORPLAN cost documentation.
	To meet MMR's of 36 CFr 219.27. Revegetate all temporary roads. Costs to meet this requirement are included in the FORPLAN model.	Timber/#9	A	Ensure adequate costs	All periods	All Suitable Forest Land.	M	FORPLAN cost documentation.
	Manage spruce-fir stands within limitations of critical factors such as shallow soils, harsh sites, exposure to prevailing winds, etc. Applied only to final harvest of stands modeled as two-storied.	Timber/#10	C	Area Control	Periods 5-17	7>% of Spruce-fir analysis areas harvested per decade. (maximum)	T	See silviculturalist notes under Prognosis model documentation in Appendix B.
	CMAI: Culmination of Mean Annual Increment. This constraint is required by 36 CFR 219.16 (a)(1). Earliest age of final harvest must be greater than or equal to the age of CMAI for the working group.	Timber/#11	C	See Rationale Remarks.	All periods	All Suitable Forest Land.	P	Same as above.

BENCHMARK/ ALTERNATIVE	RATIONALE/REMARKS	CONSTRAINED RESOURCE/ CONSTRAINT #	CONSTRNT (C) ASSUMP. (A)	TYPE OF CONSTRAINT/ ASSUMPTION	TIME PERIOD APPLIED	AMOUNT OF CON- STRAINT/ ASSUMP.	KIND OF* CONSTRAINT/ ASSUMPTION	DOCUMENTATION SOURCE
All Benchmarks and Alternatives	Perpetual Timber Harvest. This meets the requirements of 36 CFR 219.13 (1) by ensuring that the Forest contains as much timber inventory volume in the last period as the Forest would have an average, under the management intensities selected in the analysis.	Timber/#12	C	See Rationale /Remarks	All periods	See Rationale/Remarks	P	Capability of FORPLAN model internal calculation.
	LTSY: Long-term Sustained Yield Link. The harvest in the last period must be less than or equal to the log-term sustained yield calculated internally in FORPLAN. This complies with the 36 CFR 219.16 (a) (1) requirement in the NFMA regulations.	Timber/#13	C	See Rationale /Remarks	Period 17	See Rationale/Remarks	P	Capability of FORPLAN model, internal calculation.
All Benchmarks and Alternatives except: RPA80 High Productivity Max Range	NDY: Nondeclining Yield. The harvest volume for any decade shall be equal to or greater than, the harvest volume for the preceding decade. This constraint is required by 36 CFR 219.16 (a)(1). Alternatives and benchmarks where this constraint was not applied required relaxation of this constraint to meet or attempt to meet goals specified for that alternative or benchmark.	Timber/#14	C	See Rationale /Remarks	All period	See Rationale/Remarks	P	Capability of FORPLAN

C. Overall Goals and Objectives for each Alternative

1. Alternative A - Current Program (no action)

This alternative describes the current level and trend of goods and services to be provided in the future. The budget is constrained in the first decade, but increases in subsequent decades to meet projected trends. This alternative provides a "baseline" for comparison with other alternatives and helps determine the need for change.

The goals of this alternative are:

- Continue the existing developed recreation site capacity and adherence to standards to prevent site deterioration.
- Accommodate an anticipated increase in dispersed recreation visits.
- Manage the Pine Valley Mountains, Ashdown Gorge, and the Box-Death Hollow Wilderness's.
- Increase the number of research natural areas.
- Manage wildlife habitat to support minimum viable populations of all native and desired non-native vertebrate species and improve the habitat where needed for selected species.
- Maintain current levels of permitted livestock grazing.
- Maintain investments in structural and non-structural range improvements.
- Maintain timber sale offerings as described in the current timber management plan.
- Improve acres of declining watershed condition by treating the backlog of soil and water restoration needs and improving poor condition range lands.
- Maintain restrictions for mineral leasing activities. Provide prompt responses to mineral requests.
- Provide cost efficient fire suppression.

FORPLAN Objective Function

Maximize present net value for 17 decades (the length of the planning horizon for timber).

Non-FORPLAN Constraints

Current Land Use Patterns Applied
Standards and Guidelines in Mgt. Prescriptions Applied

FORPLAN Constraints Not Common To All Alternatives: Rationale for all constraints applied are to meet the defined goals of the alternative.

a. Non-declining yield with long term sustained yield link.

b. First decade harvest floor of 24MMBF per year (discretionary constraint).

c. Harvest in first decade is constrained to harvest a minimum amount of acres of analysis areas programmed on the Timber Ten Year Action Plan. These areas contribute to the harvest floor (discretionary constraint).

d. First decade constrained to apply 5,000 acres of precommercial thinning annually (discretionary constraint).

e. Visual/Wildlife and No Harvest Emphases (either emphasis will satisfy the constraint) -21,587 acres were constrained to be assigned to either Visual/Wildlife or no Harvest Emphasis which are compatible to management prescriptions assigned to the alternative by the Interdisciplinary Team and district personnel (multiple use management prescriptions 2A, 2B, 4C, 5B), (discretionary constraint).

f. No Harvest Emphasis - 3,315 acres were constrained to this emphasis. This emphasis is compatible with management prescriptions assigned to the alternative by the interdisciplinary team and district personnel (multiple use management prescriptions 1A, 1B, 9B, 10A) (discretionary constraint). Existing wilderness was previously removed from the tentatively available and suitable land base.

2. Alternative B - Composite

This alternative describes a level and trend of goods and services to be provided in the future that in total best meets the issues and concerns. The budget is constrained in the first decade, but increases in subsequent decades to meet projected trends. This alternative provides an "optimum" mix of activities that will provide cost efficiency, socioeconomic stability and meet resource needs.

The goals of this alternative are:

- Continue the existing developed recreation site capacity and adherence to standards to prevent site deterioration. Provide for increased downhill ski area capacity.
- Accommodate an anticipated increase in dispersed recreation visits by providing additional trailhead facilities, trail construction and other facilities designed to enhance dispersed types of recreation.
- Manage the Pine Valley Mountains, Ashdown Gorge, and Box-Death Hollow Wilderness's.
- Increase the number of research natural areas.
- Manage wildlife habitat to support viable populations of all native and desired non-native vertebrate species and improve the habitat where needed for selected species.
- Maintain current levels of permitted livestock grazing.
- Maintain investments in structural and non-structural range improvements.
- Maintain timber sale offerings in first decade at a level that will sustain present timber industry. Limit sale offerings on soil types where soil loss tolerance levels cannot be met.
- Improve acres of declining watershed condition by treating the backlog of soil and water restoration needs and improving poor condition range lands.
- Maintain restrictions for mineral leasing activities. Provide prompt responses to mineral requests.
- Provide cost efficient fire suppression.

FORPLAN Objective Function

Maximize present net value for 17 decades.

TABLE BVI-2
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR ALTERNATIVE A CURRENT PROGRAM *

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	466	641	958	1275	1106		
Rural ROS		186	256	383	510	804		
Road Natural ROS		280	385	575	765	302		
Dispersed Recreation Use	MRVD	780	1056	1693	2641	3391		
Primitive ROS								
Semi-Primitive								
Non-Motor ROS		110	149	239	373	508		
Semi-Primitive								
Motorized ROS		236	320	513	800	1088		
Road Natural ROS		355	480	769	1201	1634		
Rural ROS		79	107	171	267	363		
Dispersed Recreation Use (Wild.)	MRVD	8	11	17	27	36		
Primitive ROS		8	11	17	27	36		
Semi-Primitive								
Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	10	12	12	12	12		
Structural Habitat Improvement-Aquatic	STRUCTS	20	25	25	25	25		
Nonstructural Habitat Improvement-Terrestrial	ACRES	850	840	840	820	820		
Nonstructural Habitat Improvement-Aquatic	ACRES	100	110	110	130	130		
Wildlife and Fish Use	MWFUD	171	183	182	180	179		
Range								
Grazing Use (Livestock)	MAUM	115	115	115	115	115		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	5.1	5.2	5.3	5.3	5.4	5.4	5.4
Allowable Sale Quantity	MMBF	26.4	26.0	26.3	26.4	26.4	22.5	24.4
Sawtimber (Softwood)	MMBF	22.9	15.7	14.9	17.4	21.3	19.5	20.5
Sawtimber (Hardwood) **	MMBF	2.8	9.4	10.3	7.8	3.7	1.9	2.7
Roundwood Products	MMBF	0.7	0.9	1.1	1.2	1.4	1.1	1.2
Fuelwood	MMBF	10.7	8.4	8.5	8.0	9.4	8.0	8.1
Reforestation	ACRES	1588	402	454	3353	1646	1382	921
TSI	ACRES	5000	54	1769	628	250	119	0
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	4.3	8.3	8.1	6.7	6.0		
Increased Yield Over Natural-Colorado River	M AC.FT.	1.2	2.7	2.6	2.1	1.9		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	10505	7117	4641	5133	4919		

* Entries in the following tables are on an average annual basis for the decade.

** Aspen could have been displayed as roundwood rather than sawtimber in the following tables. Higher sawtimber merchantability standards were applied to aspen providing conservative volume estimates as were conservative fuelwood benefit values.

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	690	730	750	750	780		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES	2	2	2	2	2		
Soils								
Soil & Water Resource Imp.	ACRES	51	63	80	63	38		
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	28	18	15	11	7		
Reconstruction	MILES	32	34	21	22	22		
Trail Construction/Rconstruction	MILES	0	0	0	0	0		
BENEFITS M$ *								
Recreation								
Developed		1929	2654	3966	5279	8754		
Dispersed		6917	8287	10865	14769	18709		
Wilderness		90	121	191	297	403		
Total		8936	11062	15022	20345	27866		
Range		927	927	927	927	927		
Timber		1211	1257	964	512	740		
Wildlife		5551	5649	5680	5710	5741		
Water Yield		251	485	473	391	350		
Minerals		2884	3081	3038	2899	2828		
Other		21	21	21	21	21		
Total		19781	22482	26125	30805	38473		
RECEIPTS M$								
Recreation - Developed		181	244	358	472	411		
Range		116	116	116	116	116		
Timber		1198	1244	951	499	727		
Minerals		12	13	14	14	14		
Other		21	21	21	21	21		
Total		1528	1638	1460	1122	1289		
COSTS M$								
Timber		2500	1327	1071	1981	1314		
Roads (Appropriated)		48	24	24	24	24		
Recreation		640	743	733	832	653		
Wildlife		119	131	139	136	141		
Range		380	380	386	382	389		
Protection		226	335	335	335	335		
Other		2310	2309	2326	2346	2331		
Total Forest Budget		6223	5249	5014	6036	5187		
O&M		3892	3971	3902	4037	3831		
Investment		2331	1278	1112	1999	1356		
Non-Forest Service Costs (Purchaser Const. Roads)		239	170	118	100	64		
Returns to Treasury		1528	1638	1460	1122	1289		

* Dollar amounts in the following tables are average annual for the decade expressed in 1978 dollars, inflated to 1/1/82

TABLE BVI-2a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

	DECADE				
ALTERNATIVE A - CURRENT PROGRAM	1	2	3	4	5
Timber					
Costs*	2739	1497	1189	2081	1378
Benefits	1211	1257	964	512	740
Net Benefits	-1528	-240	-225	-1569	-638
Receipts	1198	1244	951	499	727
Net Receipts	-1541	-253	-238	-1582	-651
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	640	743	733	832	653
Benefits	8936	11062	15022	20345	27866
Net Benefits	8296	10319	14289	19513	27213
Receipts	181	244	358	472	411
Net Receipts	-459	-499	-375	-360	-242
Non-Cash Benefits	8755	10818	14664	19873	27455
Wildlife					
Costs	119	131	139	136	141
Benefits	5551	5649	5680	5710	5741
Net Benefits	5432	5518	5541	5574	5600
Receipts	0	0	0	0	0
Net Receipts	-119	-131	-139	-136	-141
Non-Cash Benefits	5551	5649	5680	5710	5741
Range					
Costs	380	380	386	382	389
Benefits	927	927	927	927	927
Net Benefits	547	547	541	545	538
Receipts	116	116	116	116	116
Net Receipts	-264	-264	-270	-266	-273
Non-Cash Benefits	811	811	811	811	811
Other					
Costs	2584	2668	2685	2705	2690
Benefits	3156	3587	3532	3311	3199
Net Benefits	572	919	847	606	509
Receipts	33	34	35	35	35
Net Receipts	-2551	-2634	-2650	-2670	-2655
Non-Cash Benefits	3123	3553	3497	3276	3164
Total					
Costs	6462	5419	5132	6136	5251
Benefits	19781	22482	26125	30805	38473
Net Benefits	13319	17063	20993	24669	33222
Receipts	1528	1638	1460	1122	1289
Net Receipts	-4934	-3781	-3672	-5014	-3962
Non-Cash Benefits	18253	20844	24665	29683	37184

* Includes Non-Forest Service Costs (Purchaser Constructed Roads)

Non-FORPLAN Constraints

Budget Constraint Applied
Standards and Guidelines in Mgt. Prescriptions Applied

FORPLAN Constraints Not Common To All Alternatives

Same as Alternative A. The timber program for the composite alternative is the same as portrayed in the Current Program Alternative.

3. Alternative C - Constrained Budget

This alternative describes the activities and outputs of goods and services that could be provided with a budget that is 25 percent less than the Forest's 1982 budget. The reduced budget would remain constant for the five decades of the planning period. The emphasis would be to maintain the same relative combination of resource activities as the current program alternatives, but adjusted for the budget.

The goals for this alternative are:

- Continue the existing developed recreation site capacity, but at reduced service level or less. Prevention of site deterioration would not be a goal.
- Provide, in spite of deteriorating road and trail systems, the opportunity for dispersed recreation.
- Manage the Pine Valley Mountains, Ashdown Gorge, and the Box-Death Hollow wildernesses.
- Increase the number of research natural areas.
- Manage wildlife habitat sufficient only to support minimum viable populations of all native and desired non-native vertebrate species.
- Reduce the numbers of permitted livestock commensurate with the loss of capacity due to unmaintained range improvements.
- Maintenance of range improvements would be on a priority basis to reduce the loss of capacity.
- Timber sale offerings having low preparation and road development costs would be stressed.
- Emphasize watershed restoration projects that are low cost.
- Restrictions on mineral leasing activities would not be emphasized. Response time for mineral requests would be doubled. Require industry to provide environmental and legal studies.
- Provide cost efficient fire protection.

FORPLAN Objective Function

Maximize sawtimber production for one decade. Rolled over to maximize present net value for 17 decades.

Non-FORPLAN Constraints

Budget Constraint Applied
Standards and Guidelines in Mgt. Prescriptions Applied

TABLE BVI-3
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR ALTERNATIVE B COMPOSITE

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	474	651	1060	1652	2010		
Rural ROS		261	358	583	909	1105		
Road Natural ROS		213	293	477	743	804		
Dispersed Recreation Use	MRVD	803	1253	1787	2692	3699		
Primitive ROS								
Semi-Primitive Non-Motor ROS		123	192	258	412	566		
Semi-Primitive Motorized ROS		205	320	430	687	944		
Road Natural ROS		369	575	775	1237	1700		
Rural ROS		106	166	224	355	489		
Dispersed Recreation Use (Wild.)	MRVD	8	13	17	27	38		
Primitive ROS		8	13	17	27	38		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	19	20	21	22	23		
Structural Habitat Improvement-Aquatic	STRUCTS	135	142	145	148	153		
Nonstructural Habitat Improvement-Terrestrial	ACRES	2040	2092	2145	2202	2255		
Nonstructural Habitat Improvement-Aquatic	ACRES	500	510	520	530	540		
Wildlife and Fish Use	MWFUD	180	202	197	202	202		
Range								
Grazing Use (Livestock)	MAUM	115	115	115	115	115		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	5.1	5.2	5.3	5.3	5.4	5.4	5.4
Allowable Sale Quantity	MMBF	26.4	26.0	26.3	26.4	26.4	22.5	24.4
Sawtimber (Softwood)	MMBF	22.9	15.7	14.9	17.4	21.3	19.5	20.5
Sawtimber (Hardwood)	MMBF	2.8	9.4	10.3	7.8	3.7	1.9	2.7
Roundwood Products	MMBF	0.7	0.9	1.1	1.2	1.4	1.1	1.2
Fuelwood	MMBF	10.7	8.4	8.5	8.0	9.4	8.0	8.1
Reforestation	ACRES	1588	402	454	3353	1646	1382	921
TSI	ACRES	5000	54	1769	628	250	119	0
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	4.3	8.3	8.1	6.7	6.0		
Increased Yield Over Natural-Colorado River	M AC.FT.	1.2	2.7	2.6	2.1	1.9		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	10505	7117	4641	5133	4919		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	691	750	690	665	655		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES	2	3	3	4	4		
Soils								
Soil & Water Resource Imp.	ACRES	85	138	35	20	20		
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	28	18	14	11	7		
Reconstruction	MILES	32	34	21	22	21		
Trail Construction/Rconstruction	MILES	33	70	40	0	0		
BENEFITS M$								
Recreation								
Developed		1961	2694	4385	6836	8313		
Dispersed		7651	10016	11796	18542	20088		
Wilderness		90	141	190	304	417		
Total		9702	12851	16371	25682	28818		
Range		927	927	927	927	927		
Timber		1211	1257	964	512	740		
Wildlife		5665	6334	6317	6334	6334		
Water Yield		251	485	473	391	350		
Minerals		2903	3082	3001	2916	2825		
Other		21	21	21	21	21		
Total		20680	24957	28074	36783	40015		
RECEIPTS M$								
Recreation - Developed		184	247	395	608	737		
Range		116	116	116	116	116		
Timber		1198	1244	951	499	727		
Minerals		13	14	12	12	12		
Other		21	21	21	21	21		
Total		1532	1642	1495	1256	1613		
COSTS M$								
Timber		2500	1327	1071	1981	1314		
Roads (Appropriated)		24	0	0	0	0		
Recreation		969	1142	1183	1174	1154		
Wildlife		375	325	357	306	340		
Range		490	632	642	571	573		
Protection		373	335	335	335	335		
Other		2885	3071	2518	2796	2792		
Total Forest Budget		7616	6832	6106	7163	6508		
O&M		4868	5083	4516	4779	4925		
Investment		2748	1749	1590	2384	1583		
Non-Forest Service Costs (Purchaser Const. Roads)		239	170	118	100	64		
Returns to Treasury		1532	1642	1495	1256	1613		

TABLE BVI-3a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

ALTERNATIVE B - COMPOSITE	DECADE 1	2	3	4	5
Timber					
Costs	2739	1497	1189	2081	1378
Benefits	1211	1257	964	512	740
Net Benefits	-1528	-240	-225	-1569	-638
Receipts	1198	1244	951	499	727
Net Receipts	-1541	-253	-238	-1582	-651
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	969	1142	1183	1174	1154
Benefits	9702	12851	16371	25682	28818
Net Benefits	8733	11709	15188	24508	27664
Receipts	184	247	395	608	737
Net Receipts	-785	-895	-788	-566	-417
Non-Cash Benefits	9518	12604	15976	25074	28081
Wildlife					
Costs	375	325	357	306	340
Benefits	5665	6334	6317	6334	6334
Net Benefits	5290	6009	5960	6028	5994
Receipts	0	0	0	0	0
Net Receipts	-375	-325	-357	-306	-340
Non-Cash Benefits	5665	6334	6317	6334	6334
Range					
Costs	490	632	642	571	573
Benefits	927	927	927	927	927
Net Benefits	437	295	285	356	354
Receipts	116	116	116	116	116
Net Receipts	-374	-516	-526	-455	-457
Non-Cash Benefits	811	811	811	811	811
Other					
Costs	3282	3406	2853	3131	3127
Benefits	3175	3588	3495	3328	3196
Net Benefits	-107	182	642	197	69
Receipts	34	35	33	33	33
Net Receipts	-3248	-3371	-2820	-3098	-3094
Non-Cash Benefits	3141	3553	3462	3295	3163
Total					
Costs	7855	7002	6224	7263	6572
Benefits	20680	24957	28074	36783	40015
Net Benefits	12825	17955	21850	29520	33443
Receipts	1532	1642	1495	1256	1613
Net Receipts	-6323	-5360	-4729	-6007	-4959
Non-Cash Benefits	19148	23315	26579	35527	38402

TABLE BVI-4
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR ALTERNATIVE C CONSTRAINED BUDGET

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	269	277	308	362	416		
Rural ROS		148	152	169	199	229		
Road Natural ROS		121	125	138	163	187		
Dispersed Recreation Use	MRVD	731	1125	1341	1995	2651		
Primitive ROS								
Semi-Primitive Non-Motor ROS		103	159	190	283	375		
Semi-Primitive Motorized ROS		221	341	406	604	803		
Road Natural ROS		368	568	677	1007	1339		
Rural ROS		39	57	68	101	134		
Dispersed Recreation Use (Wild.)	MRVD	8	12	14	20	27		
Primitive ROS		8	12	14	20	27		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	2	2	2	2	2		
Structural Habitat Improvement-Aquatic	STRUCTS	5	5	5	5	5		
Nonstructural Habitat Improvement-Terrestrial	ACRES	50	50	50	50	50		
Nonstructural Habitat Improvement-Aquatic	ACRES	0	0	0	0	0		
Wildlife and Fish Use	MWFUD	139	153	146	145	145		
Range								
Grazing Use (Livestock)	MAUM	110	107	105	103	100		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Allowable Sale Quantity	MMBF	22.4	23.5	24.4	24.5	22.8	19.1	23.5
Sawtimber (Softwood)	MMBF	14.1	15.3	19.0	21.2	16.1	14.9	22.1
Sawtimber (Hardwood)	MMBF	7.9	7.8	5.0	2.9	6.2	3.8	1.0
Roundwood Products	MMBF	0.4	0.4	0.4	0.4	0.5	0.4	0.4
Fuelwood	MMBF	7.6	5.5	5.2	5.8	6.6	4.5	5.5
Reforestation	ACRES	315	675	378	1092	1869	1891	2099
TSI	ACRES	447	957	4103	1609	593	0	0
Water								
Meeting Water Quality Goals	%	98	98	98	98	98		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	4.6	6.0	5.2	5.2	6.4		
Increased Yield Over Natural-Colorado River	M AC.FT.	1.2	1.6	1.3	1.6	2.2		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	6525	5558	5077	4713	3787		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	595	660	600	575	565		
HC&D								
Human Resource Programs	EN.YEARS	2	2	2	2	2		
Lands								
Land Pur., Acq., & Exchange	CASES	1	1	1	1	1		
Soils								
Soil & Water Resource Imp.	ACRES	33	33	33	33	33		
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES	1	0	0	0	0		
Local Roads								
Construction	MILES	15	18	17	17	10		
Reconstruction	MILES	33	23	15	13	16		
Trail Construction/Rconstruction	MILES	0	0	0	0	0		
BENEFITS M$								
Recreation								
Developed		1113	1147	1274	1498	1722		
Dispersed		6880	8250	8500	11620	13040		
Wilderness		83	128	151	223	297		
Total		8076	9525	9925	13341	15059		
Range		887	862	847	830	806		
Timber		1151	976	950	753	248		
Wildlife		5631	5289	4993	4949	4976		
Water Yield		268	350	304	304	374		
Minerals		2665	2765	2726	2698	2700		
Other		21	21	21	21	21		
Total		18699	19788	19766	22896	24184		
RECEIPTS M$								
Recreation - Developed		110	113	124	143	163		
Range		111	108	106	104	101		
Timber		1138	963	937	740	235		
Minerals		11	12	11	10	10		
Other		21	21	21	21	21		
Total		1391	1217	1199	1018	530		
COSTS M$								
Timber		1227	1332	1331	1332	1331		
Roads (Appropriated)		48	24	24	24	24		
Recreation		477	483	531	536	540		
Wildlife		52	53	56	59	60		
Range		240	234	229	224	228		
Protection		357	342	346	346	346		
Other		1737	1758	1735	1713	1701		
Total Forest Budget		4138	4226	4252	4234	4230		
O&M		2984	2950	2919	2898	2863		
Investment		1154	1276	1333	1336	1367		
Non-Forest Service Costs (Purchaser Const. Roads)		143	147	123	115	76		
Returns to Treasury		1391	1217	1199	1018	530		

TABLE BVI-4a

AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *

(Thousands of 1978 Dollars Inflated to 1/1/82)

	DECADE				
ALTERNATIVE C - CONSTRAINED BUDGET	1	2	3	4	5
Timber					
Costs	1370	1479	1454	1447	1407
Benefits	1151	976	950	753	248
Net Benefits	-219	-503	-504	-694	-1159
Receipts	1138	963	937	740	235
Net Receipts	-232	-516	-517	-707	-1172
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	477	483	531	536	540
Benefits	8076	9525	9925	13341	15059
Net Benefits	7599	9042	9394	12805	14519
Receipts	110	113	124	143	163
Net Receipts	-367	-370	-407	-393	-377
Non-Cash Benefits	7966	9412	9801	13198	14896
Wildlife					
Costs	52	53	56	59	60
Benefits	5631	5289	4993	4949	4976
Net Benefits	5579	5236	4937	4890	4916
Receipts	0	0	0	0	0
Net Receipts	-52	-53	-56	-59	-60
Non-Cash Benefits	5631	5289	4993	4949	4976
Range					
Costs	240	234	229	224	228
Benefits	887	862	847	830	806
Net Benefits	647	628	618	606	578
Receipts	111	108	106	104	101
Net Receipts	-129	-126	-123	-120	-127
Non-Cash Benefits	776	754	741	726	705
Other					
Costs	2142	2124	2105	2083	2171
Benefits	2954	3136	3051	3023	3095
Net Benefits	812	1012	946	940	1024
Receipts	32	33	32	31	31
Net Receipts	-2110	-2091	-2073	-2052	-2040
Non-Cash Benefits	2922	3103	3019	2992	3064
Total					
Costs	4281	4373	4375	4349	4306
Benefits	18699	19788	19766	22896	24184
Net Benefits	14418	15415	15391	18547	19878
Receipts	1391	1217	1199	1018	530
Net Receipts	-2890	-3156	-3176	-3331	-3776
Non-Cash Benefits	17308	18571	18567	21878	23654

* Includes Non-Forest Service Costs (Purchaser Constructed Roads)

FORPLAN Constraints Not Common To All Alternatives

a. Non-declining yield constraint with long term sustained yield link.

b. Budget Constraint-Budget is constrained to $944,700 annually (Timber Programs current share -35% of the amount outlined in the regional checklist for the Dixie National Forest constrained budget level in 1978 dollars). The constraint applies to costs incurred on all model activities except purchaser road construction and reconstruction and additional logging costs for cable and aerial logging systems (discretionary constraint).

c. Visual Wildlife or No Harvest Emphasis-21,587 acres constrained to this emphasis. See Alternative A Constraints for an explanation of this prescription emphasis (discretionary constraint).

d. No Harvest Emphasis- 3,315 acres constrained to this emphasis. See Alternative A constraints for an explanation of this prescription emphasis.

4. Alternative D - Current Budget

This alternative describes the activities and outputs of goods and services that could be provided with a constant budget similar to the Forest's 1982 budget. The emphasis would be to maintain the same combination of resource activities as the Current Program Alternative, but reduced because the Forest could not meet increased demands, nor continuation of some existing facilities and improvements.

The goals for this alternative are:

- Maintain the existing developed recreation site capacity with reduced services and facilities. Adhere to standards to prevent site deterioration.
- Accommodate an anticipated increase in dispersed recreation visits with the existing services and facilities.
- Protect the wilderness values of the Pine Valley Mountain, Ashdown Gorge, and Box-Death Hollow areas.
- Increase the number of research natural areas.
- Manage wildlife habitat to support minimum viable populations of all native and desired non-native vertebrate species and maintain existing habitat improvements.
- Reduce the numbers of livestock commensurate with the loss of capacity due to unmaintained crested wheat reseedings.
- Maintain investment in structural and non-structural range improvements on a priority basis of cost efficiency.
- Complete the current timber harvest program for mountain pine beetle affected timber then reduce timber sale offerings described in the current timber, management plan to avoid sale offerings with high preparation, and road development costs.
- Improve acres of declining watershed condition by treating most of the backlog of soil and water restoration needs and improving one-half of poor condition rangeland.
- Maintain restrictions for mineral leasing activities. Provide prompt responses to mining industry requests.
- Provide cost efficient fire suppression.

FORPLAN Objective Function

Maximize sawtimber production for one decade. Rolled over to maximize present net value for 17 decades.

Non-FORPLAN Constraints

Budget Constraints Applied
Standards and Guidelines in Mgt. Prescriptions Applied

FORPLAN Constraints Not Common To All Alternatives

a. Non-declining yield constraint with long term sustained yield link.

b. Budget Constraint-Budget is constrained to $1,257,000 annually (Timber Programs current share -35% of the amount outlined in the regional checklist for the Dixie National Forest Current budget level in 1978 dollars). The constraint applies to costs incurred on all model activities except purchaser road construction and reconstruction and additional logging costs for cable and aerial logging systems (discretionary constraint).

c. Visual Wildlife or No Harvest Emphases- 21,587 acres constrained to this emphasis. See Alternative A Constraints for an explanation of this prescription emphasis (discretionary constraint).

d. No Harvest Emphasis- 3,315 acres constrained to this emphasis. See Alternative A Constraints for an explanation of this prescription emphasis (discretionary constraint).

5. Alternative E - Non-Market Emphasis

This alternative describes the activities and outputs of goods and services that could be provided if emphasis was provided to the amenity values. Outputs for water, wildlife, and dispersed recreation would increase and quality would be enhanced. Conversely, timber, range, and developed recreation would be managed at a lower level or in such a manner that would enhance amenity and dispersed recreation values.

The goals of this alternative are:

- Expand the developed recreation site capacity in areas where expansion will enhance dispersed recreation and continue adherence to standards to prevent site deterioration. Provide emphasis in expansion of site capacity to enhance quality and opportunities to emphasize dispersed recreation.
- Accommodate and enhance the quality experience for the anticipated increase in dispersed recreation visits.
- Protect the wilderness values of the Pine Valley Mountains, Ashdown Gorge, and Box-Death Hollow areas.
- Increase the number of Research Natural Areas.
- Manage wildlife habitat to support optimum population of native and desired non-native wildlife species.
- Reduce the current levels of permitted livestock grazing to enhance wildlife, scenic, and recreation values.

TABLE BVI-5
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR ALTERNATIVE D CURRENT BUDGET

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	466	468	507	525	543		
Rural ROS		256	258	279	289	299		
Road Natural ROS		210	211	228	236	244		
Dispersed Recreation Use	MRVD	806	1070	1708	2656	3604		
Primitive ROS								
Semi-Primitive Non-Motor ROS		114	151	242	376	510		
Semi-Primitive Motorized ROS		244	324	518	805	1092		
Road Natural ROS		366	486	776	1207	1638		
Rural ROS		81	109	173	269	364		
Dispersed Recreation Use (Wild.)	MRVD	8	11	17	27	36		
Primitive ROS		8	11	17	27	36		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	10	10	8	6	5		
Structural Habitat Improvement-Aquatic	STRUCTS	20	20	20	20	20		
Nonstructural Habitat Improvement-Terrestrial	ACRES	640	620	600	560	480		
Nonstructural Habitat Improvement-Aquatic	ACRES	160	155	150	140	120		
Wildlife and Fish Use	MWFUD	175	172	168	166	164		
Range								
Grazing Use (Livestock)	MAUM	115	115	115	115	115		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Allowable Sale Quantity	MMBF	27.0	28.4	29.2	28.9	28.2	23.0	27.4
Sawtimber (Softwood)	MMBF	19.7	17.4	23.8	20.9	23.2	18.0	20.3
Sawtimber (Hardwood)	MMBF	6.5	10.6	4.6	7.2	4.2	4.2	6.1
Roundwood Products	MMBF	0.8	0.4	0.8	0.8	0.8	0.8	1.0
Fuelwood	MMBF	10.1	7.2	6.8	7.7	8.7	7.5	8.5
Reforestation	ACRES	830	476	720	2641	2400	2529	1206
TSI	ACRES	980	1556	3801	1251	264	550	0
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	4.8	7.6	6.9	7.0	7.0		
Increased Yield Over Natural-Colorado River	M AC.FT.	1.1	2.0	2.0	2.2	2.5		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	7957	7717	6954	4471	5342		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	691	750	690	665	655		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES	2	1	2	1	1		
Soils								
Soil & Water Resource Imp.	ACRES	43	46	68	68	47		
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	15	28	20	12	6		
Reconstruction	MILES	38	26	17	20	25		
Trail Construction/Rconstruction	MILES	0	0	0	0	0		
BENEFITS M$								
Recreation								
Developed		1930	1938	2097	2173	2247		
Dispersed		7067	8261	10724	14625	18593		
Wilderness		90	119	190	297	402		
Total		9087	10318	13011	17095	21242		
Range		927	927	927	927	927		
Timber		1495	1056	528	862	895		
Wildlife		5637	5936	5509	5481	5493		
Water Yield		280	444	403	409	409		
Minerals		2903	3082	3001	2916	2825		
Other		21	21	21	21	21		
Total		20350	21784	23400	27711	31812		
RECEIPTS M$								
Recreation - Developed		181	181	196	202	208		
Range		116	116	116	116	116		
Timber		1482	1043	515	849	882		
Minerals		13	14	12	12	12		
Other		21	21	21	21	21		
Total		1813	1375	860	1200	1239		
COSTS M$								
Timber		1824	1716	1736	1810	1799		
Roads (Appropriated)		183	23	24	24	24		
Recreation		717	847	667	681	704		
Wildlife		126	120	117	113	110		
Range		310	309	300	267	271		
Protection		230	345	335	345	345		
Other		2083	2103	2070	2067	2079		
Total Forest Budget		5473	5463	5249	5307	5332		
O&M		3561	3833	3536	3441	3495		
Investment		1912	1630	1713	1866	1837		
Non-Forest Service Costs (Purchaser Const. Roads)		159	227	146	99	68		
Returns to Treasury		1813	1375	860	1200	1239		

TABLE BVI-5a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

ALTERNATIVE D - CURRENT BUDGET	DECADE 1	2	3	4	5
Timber					
Costs	1983	1943	1882	1909	1867
Benefits	1495	1056	528	862	895
Net Benefits	-488	-887	-1354	-1047	-972
Receipts	1482	1043	515	849	882
Net Receipts	-501	-900	-1367	-1060	-985
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	717	847	667	681	704
Benefits	9087	10318	13011	17095	21242
Net Benefits	8370	9471	12334	16414	20538
Receipts	181	181	196	202	208
Net Receipts	-536	-666	-471	-479	-496
Non-Cash Benefits	8906	10137	12815	16893	21034
Wildlife					
Costs	126	120	117	113	110
Benefits	5637	5936	5509	5481	5493
Net Benefits	5511	5816	5392	5368	5383
Receipts	0	0	0	0	0
Net Receipts	-126	-120	-117	-113	-110
Non-Cash Benefits	5637	5936	5509	5481	5493
Range					
Costs	310	309	300	267	271
Benefits	927	927	927	927	927
Net Benefits	617	618	627	660	656
Receipts	116	116	116	116	116
Net Receipts	-194	-193	-184	-151	-155
Non-Cash Benefits	811	811	811	811	811
Other					
Costs	2496	2471	2429	2436	2448
Benefits	3204	3547	3425	3346	3255
Net Benefits	708	1076	996	910	807
Receipts	34	35	33	33	33
Net Receipts	-2462	-2436	-2396	-2403	-2415
Non-Cash Benefits	3174	3516	3394	3317	3226
Total					
Costs	5632	5690	5395	5406	5400
Benefits	20350	21784	23400	27711	31812
Net Benefits	14718	16094	18005	22305	26412
Receipts	1813	1375	860	1200	1239
Net Receipts	-3819	-4315	-4535	-4206	-4161
Non-Cash Benefits	18541	20413	22542	26515	30577

- Maintain investments in structural and non-structural range improvements.
- Modify timber harvest and cultural activities to enhance wildlife, scenic, and recreation values.
- Improve acres of declining watershed condition by treating the backlog of soil and water restoration needs and improving poor condition rangeland.
- Increase the current restrictions for mineral leasing activities to protect environmental values. Provide prompt responses to mineral requests.
- Rehabilitate soil and water values damaged by future mining activities.
- Provide cost efficient fire suppression.

FORPLAN Objective Function

Maximize sawtimber production for one decade. Rolled over to maximize present net value for 17 decade.

Non-FORPLAN Constraints

Standards and Guidelines in Mgt. Prescriptions Applied

FORPLAN Constraints Not Common To All Alternatives

a. Non-declining yield constraint with long term sustained yield link.

b. No Harvest Emphasis applied to areas identified as occurring on slopes greater than 40% (discretionary constraint).

c. No Harvest Emphasis applied to areas identified as difficult to regenerate (discretionary constraint).

d. Harvest a minimum of 7000 acres of aspen (clear cut) annually for the first four decades for wildlife habitat improvement (discretionary constraint).

e. Wildlife/Visual or No Harvest Emphases- This constraint is applied to 33,697 acres. See alternative A Constraints for an explanation of this prescription emphasis (discretionary constraint).

6. Alternative F - Market Emphasis

This Alternative describes the activities and outputs of goods and services that could be provided if the Forest emphasized market outputs--those that produce revenue for the government. High output levels in developed recreation, timber harvesting, and livestock grazing will be stressed. Restrictive stipulations on mineral activities will be relaxed to encourage higher mineral outputs. The timber harvesting levels will be limited to what can be achieved with an even-flow (non-declining) sustained yield of forest products. Less than optimum, but legally sufficient, levels of outputs for water quality, wildlife, and dispersed recreation will be achieved.

The goals of this alternative are:

- Expand the developed recreation site capacity to accommodate all anticipated users. Adhere to standards to prevent site deterioration.
- Accommodate an anticipated increase in dispersed recreation visits.

TABLE BVI-6
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR ALTERNATIVE E NON-MARKET EMPHASIS

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	442	525	740	837	1014		
Rural ROS		243	289	407	407	558		
Road Natural ROS		199	236	333	430	456		
Dispersed Recreation Use	MRVD	798	1256	1700	2728	3755		
Primitive ROS								
Semi-Primitive Non-Motor ROS		120	188	255	409	563		
Semi-Primitive Motorized ROS		319	502	680	1091	1502		
Road Natural ROS		279	440	595	955	1314		
Rural ROS		80	126	170	273	376		
Dispersed Recreation Use (Wild.)	MRVD	8	13	17	27	38		
Primitive ROS		8	13	17	27	38		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	11	16	17	17	18		
Structural Habitat Improvement-Aquatic	STRUCTS	39	44	33	30	30		
Nonstructural Habitat Improvement-Terrestrial	ACRES	1630	1900	1902	1902	1902		
Nonstructural Habitat Improvement-Aquatic	ACRES	230	230	145	135	120		
Wildlife and Fish Use	MWFUD	183	211	204	211	211		
Range								
Grazing Use (Livestock)	MAUM	90	90	90	90	90		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	4.7	5.2	5.3	5.3	5.3	5.3	5.3
Allowable Sale Quantity	MMBF	21.5	24.0	24.5	24.9	23.7	21.2	23.6
Sawtimber (Softwood)	MMBF	15.5	11.4	13.7	14.5	15.5	11.6	11.7
Sawtimber (Hardwood)	MMBF	3.5	8.7	6.7	6.2	3.9	5.6	7.9
Roundwood Products	MMBF	2.5	3.9	4.1	4.2	4.3	4.0	4.0
Fuelwood	MMBF	7.5	8.4	8.4	8.4	8.4	8.4	8.4
Reforestation	ACRES	586	345	681	1677	2814	689	729
TSI	ACRES	37	645	2171	627	226	1717	0
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	3.9	5.7	5.6	5.7	5.4		
Increased Yield Over Natural-Colorado River	M AC.FT.	0.9	1.4	1.4	1.6	1.9		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	6775	4350	3779	4324	4198		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	652	714	654	629	629		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES	2	2	3	2	3		
Soils								
Soil & Water Resource Imp.	ACRES	85	138	35	20	20		
Facilities								
Arterial and Collector Roads								
Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	9	19	11	7	5		
Reconstruction	MILES	31	18	20	23	23		
Trail Construction/Rconstruction	MILES	37	38	38	33	33		
BENEFITS M$								
Recreation								
Developed		1831	2173	3060	3060	4197		
Dispersed		7174	15589	11333	15509	19802		
Wilderness		91	141	190	304	417		
Total		9096	17903	14583	18873	24416		
Range		725	725	725	725	725		
Timber		1261	930	897	800	990		
Wildlife		5643	6284	6203	6178	6203		
Water Yield		228	333	327	333	315		
Minerals		2898	3078	3034	2913	2822		
Other		21	21	21	21	21		
Total		19872	29274	25790	29843	35492		
RECEIPTS M$								
Recreation - Developed		172	202	279	314	378		
Range		91	91	91	91	91		
Timber		1248	917	884	787	977		
Minerals		12	13	12	11	11		
Other		21	21	21	21	21		
Total		1544	1244	1287	1224	1478		
COSTS M$								
Timber		1228	969	1065	1358	1563		
Roads (Appropriated)		24	23	24	24	24		
Recreation		2304	1710	2017	2011	2108		
Wildlife		222	267	274	309	332		
Range		293	265	272	275	280		
Protection		357	345	345	345	345		
Other		2329	2216	2243	2307	2281		
Total Forest Budget		6757	5796	6240	6629	6933		
O&M		5057	4246	4456	4695	4805		
Investment		1700	1550	1784	1934	2128		
Non-Forest Service Costs (Purchaser Const. Roads)		123	124	101	120	49		
Returns to Treasury		1544	1244	1287	1224	1478		

TABLE BVI-6a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

	DECADE				
ALTERNATIVE E - NON-MARKET	1	2	3	4	5
Timber					
Costs	1351	1093	1166	1478	1612
Benefits	1261	930	897	800	990
Net Benefits	-90	-163	-269	-678	-622
Receipts	1248	917	884	787	977
Net Receipts	-103	-176	-282	-691	-635
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	2304	1710	2017	2011	2108
Benefits	9096	17903	14583	18873	24416
Net Benefits	6792	16193	12566	16862	22308
Receipts	172	202	279	314	378
Net Receipts	-2132	-1508	-1738	-1697	-1730
Non-Cash Benefits	8924	17701	14304	18559	24038
Wildlife					
Costs	222	267	274	309	332
Benefits	5643	6284	6203	6178	6203
Net Benefits	5421	6017	5929	5869	5871
Receipts	0	0	0	0	0
Net Receipts	-222	-267	-274	-309	-332
Non-Cash Benefits	5643	6284	6203	6178	6203
Range					
Costs	293	265	272	275	280
Benefits	725	725	725	725	725
Net Benefits	432	460	453	450	445
Receipts	91	91	91	91	91
Net Receipts	-202	-174	-181	-184	-189
Non-Cash Benefits	634	634	634	634	634
Other					
Costs	2710	2585	2612	2676	2650
Benefits	3147	3432	3382	3267	3158
Net Benefits	437	847	770	591	508
Receipts	33	34	33	32	32
Net Receipts	-2677	-2551	-2579	-2644	-2618
Non-Cash Benefits	3112	3396	3349	3233	3124
Total					
Costs	6880	5920	6341	6749	6982
Benefits	19872	29274	25790	29843	35492
Net Benefits	12992	23354	19449	23094	28510
Receipts	1544	1244	1287	1224	1478
Net Receipts	-5336	-4676	-5054	-5525	-5504
Non-Cash Benefits	18326	28028	24503	28617	34012

- Manage the Pine Valley Mountains, Ashdown Gorge, and the Box-Death Hollow as wilderness's.
- Increase the number of Research Natural Areas.
- Manage wildlife habitat sufficient only to support minimum viable populations of all native and desired non-native vertebrate species.
- Increase the levels of permitted livestock.
- Increase the numbers of range improvements and maintenance levels.
- Increase timber harvest levels by including steep timbered slopes and timber cultural activities.
- Treat backlog of watershed restoration needs.
- Decrease the current restrictions for mineral leasing activities. Provide prompt responses to mining industry requests.
- Provide cost efficient fire suppression.

FORPLAN Objective Function

Maximize sawtimber production for the first decade. Rolled over to maximize present net value for 17 decades.

Non-FORPLAN Constraints

Standards and Guidelines in Mgt. Prescriptions Applied

FORPLAN Constraints Not Common To All Alternatives

a. Non-declining yield constraint with long term sustained yield link.

b. Wildlife/Visual or No Harvest Emphases this constraint is applied to 6,790 acres. See Alternative A for an explanation of this prescription emphasis (discretionary constraint).

c. No Harvest Emphasis- This constraint is applied to 2,261 acres, primarily for developed recreation. See Alternative A for an explanation of this prescription emphasis (discretionary constraint).

7. Alternative G - 1980 RPA

This alternative describes the activities and outputs of goods and services that could be provided if the Forest achieved the targets outlined in the Intermountain Regional Guide.

The goal of this alternative are:
achieve the levels of activities and outputs described on pages 3-1 to 3-40 and page 3-46 of the Regional Guide for the Intermountain Region.

FORPLAN Objective Function

Maximize present net value for 17 decades.

Non-FORPLAN Constraints

Standards and Guidelines in Mgt. Prescriptions Applied.

TABLE BVI-7
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR ALTERNATIVE F MARKET EMPHASIS

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	474	651	1060	1936	2813		
Rural ROS		361	358	583	1065	1547		
Road Natural ROS		213	293	477	871	1266		
Dispersed Recreation Use	MRVD	459	781	1479	2121	2642		
Primitive ROS								
Semi-Primitive Non-Motor ROS		66	78	148	212	264		
Semi-Primitive Motorized ROS		165	195	370	530	660		
Road Natural ROS		330	391	739	1061	1321		
Rural ROS		99	117	221	318	396		
Dispersed Recreation Use (Wild.)	MRVD	8	10	17	23	28		
Primitive ROS		8	10	17	23	28		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	10	10	10	10	10		
Structural Habitat Improvement-Aquatic	STRUCTS	35	35	35	35	35		
Nonstructural Habitat Improvement-Terrestrial	ACRES	665	600	560	520	480		
Nonstructural Habitat Improvement-Aquatic	ACRES	165	150	140	130	120		
Wildlife and Fish Use	MWFUD	155	186	184	183	182		
Range								
Grazing Use (Livestock)	MAUM	117	117	117	117	117		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	5.9	5.9	6.0	6.0	6.0	6.0	6.0
Allowable Sale Quantity	MMBF	28.7	30.7	31.6	30.8	30.1	24.4	27.8
Sawtimber (Softwood)	MMBF	18.8	19.8	24.5	25.5	23.4	20.2	25.0
Sawtimber (Hardwood)	MMBF	9.1	9.9	6.0	4.1	5.4	3.2	1.6
Roundwood Products	MMBF	0.8	1.0	1.1	1.2	1.3	1.0	1.2
Fuelwood	MMBF	9.9	7.1	8.2	7.9	9.6	6.5	7.0
Reforestation	ACRES	1169	413	681	5051	1837	2556	566
TSI	ACRES	365	1801	3621	1092	300	1388	0
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	5.5	7.7	7.3	7.3	8.0		
Increased Yield Over Natural-Colorado River	M AC.FT.	1.4	2.0	2.1	2.4	2.9		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	8052	8167	7435	6259	5947		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	786	839	779	774	744		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES	2	2	3	2	3		
Soils								
Soil & Water Resource Imp.	ACRES	63	75	92	75	50		
Facilities								
Arterial and Collector Roads								
Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	17	27	24	9	5		
Reconstruction	MILES	40	27	16	26	28		
Trail Construction/Rconstruction	MILES	7	7	7	7	7		
BENEFITS M$								
Recreation								
Developed		1962	2694	4386	8014	11642		
Dispersed		7176	7741	11184	13171	15348		
Wilderness		91	105	182	253	310		
Total		9229	10540	15752	21438	27300		
Range		943	943	943	943	943		
Timber		1465	1153	373	908	741		
Wildlife		5631	5711	5623	5588	5604		
Water Yield		321	449	426	426	467		
Minerals		2914	3069	3026	2904	2813		
Other		21	21	21	21	21		
Total		20524	21886	26164	32228	37889		
RECEIPTS M$								
Recreation - Developed		184	247	395	710	1026		
Range		118	118	118	118	118		
Timber		1452	1140	360	895	728		
Minerals		14	15	14	14	13		
Other		21	21	21	21	21		
Total		1789	1541	908	1758	1906		
COSTS M$								
Timber		1707	1684	1751	2787	1484		
Roads (Appropriated)		48	24	24	24	24		
Recreation		882	963	981	2529	3529		
Wildlife		144	147	144	148	147		
Range		530	557	570	578	594		
Protection		774	765	764	765	763		
Other		2391	2557	2634	3002	3052		
Total Forest Budget		6476	6697	6868	9833	9593		
O&M		4667	4940	5005	5616	5899		
Investment		1809	1757	1863	4217	3694		
Non-Forest Service Costs (Purchaser Const. Roads)		176	224	173	90	65		
Returns to Treasury		1789	1541	908	1758	1906		

TABLE BVI-7a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

ALTERNATIVE F - MARKET EMPHASIS	DECADE 1	2	3	4	5
Timber					
Costs	1883	1908	1924	2877	1549
Benefits	1465	1153	373	908	741
Net Benefits	-418	-755	-1551	-1969	-808
Receipts	1452	1140	360	895	728
Net Receipts	-431	-768	-1564	-1982	-821
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	882	963	981	2529	3529
Benefits	9229	10540	15752	21438	27300
Net Benefits	8347	9577	14771	18909	23771
Receipts	184	247	395	710	1026
Net Receipts	-698	-716	-586	1819	-2503
Non-Cash Benefits	9045	10293	15357	20728	26274
Wildlife					
Costs	144	147	144	148	147
Benefits	5631	5711	5623	5588	5604
Net Benefits	5487	5564	5479	5440	5457
Receipts	0	0	0	0	0
Net Receipts	-144	-147	-144	-148	-147
Non-Cash Benefits	5631	5711	5623	5588	5604
Range					
Costs	530	557	570	578	594
Benefits	943	943	943	943	943
Net Benefits	413	386	373	365	349
Receipts	118	118	118	118	118
Net Receipts	-412	-439	-452	-460	-476
Non-Cash Benefits	825	825	825	825	825
Other					
Costs	3213	3346	3422	3791	3839
Benefits	3256	3539	3473	3351	3301
Net Benefits	43	193	51	-440	-538
Receipts	35	36	35	35	34
Net Receipts	-3178	-3310	-3387	-3756	-3805
Non-Cash Benefits	3221	3503	3438	3316	3267
Total					
Costs	6652	6921	7041	9923	9658
Benefits	20524	21886	26164	32228	37889
Net Benefits	13872	14945	19123	22305	28231
Receipts	1789	1541	908	1758	1906
Net Receipts	-4863	-5380	-6133	-8165	-7752
Non-Cash Benefits	18735	20345	25256	30470	35983

FORPLAN Constraints Not Common To All Alternatives

a. Non-declining yield constraint applied from 5th decade until 17th decade.

b. Floor on sawtimber production to meet RPA goals. Mix of softwood and hardwood sawtimber was not constrained (discretionary constraint).

Decade 1 - 32 MMBF
Decade 2 - 34 MMBF
Decade 3 - 31 MMBF
Decade 4 - 28 MMBF
Decade 5 - 26 MMBF

c. Timber stand improvement constrained to 1450 acres per year in first decade and 900 acres per year in decades 2 through 5 to meet RPA goals (discretionary constraint).

d. Wildlife/Visual or No Harvest Emphases - 21,587 acres constrained to this emphasis. See Alternative A Constraints for an explanation of this prescription emphasis (discretionary constraint).

e. No Harvest Emphasis - 3,315 acres constrained to this emphasis. See Alternative A for an explanation of this prescription emphasis (discretionary constraint).

8. Alternative H - High Productivity

This alternative describes the activities and outputs of goods and services that could be provided if the Forest emphasized the outputs of timber and range. The outputs of other goods and services would be on a cost efficient level after meeting high timber and range targets.

The goals of this alternative are:

- Maintain the existing developed recreation site capacity with reduced services and facilities. Adhere to standards to prevent site deterioration.
- Accommodate an anticipated increase in dispersed recreation visits with the existing services and facilities.
- Manage the Pine Valley Mountains, Ashdown Gorge, and the Box-Death Hollow as wilderness's.
- Increase the number of Research Natural Areas.
- Manage wildlife habitat to support minimum viable populations of all native and desired non-native vertebrate species and maintain existing habitat improvements.
- Increase the numbers of permitted livestock by observing only the minimum legal protection of soil and water values, wildlife values and other legal requirements i.e., Cultural Resources T&E species.
- Increase the amount of and quality of structural and nonstructural range improvement.
- Increase the timber harvest levels by adoption of the following policies:

TABLE BVI-8
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR ALTERNATIVE G 1980 RPA

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	425	455	771	615	1351		
Rural ROS		234	250	424	338	743		
Road Natural ROS		191	205	347	277	608		
Dispersed Recreation Use	MRVD	611	511	624	971	1317		
Primitive ROS								
Semi-Primitive								
Non-Motor ROS		87	95	88	137	186		
Semi-Primitive								
Motorized ROS		187	204	189	294	399		
Road Natural ROS		275	306	284	441	598		
Rural ROS		63	68	63	98	133		
Dispersed Recreation Use (Wild.)	MRVD	6	7	9	10	13		
Primitive ROS		6	7	9	10	13		
Semi-Primitive								
Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	12	13	16	16	16		
Structural Habitat Improvement-Aquatic	STRUCTS	39	51	41	51	56		
Nonstructural Habitat Improvement-Terrestrial	ACRES	680	805	803	805	806		
Nonstructural Habitat Improvement-Aquatic	ACRES	210	251	251	251	252		
Wildlife and Fish Use	MWFUD	183	204	198	204	204		
Range								
Grazing Use (Livestock)	MAUM	119	120	121	122	123		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	6.6	6.9	6.2	5.7	5.4	5.3	5.3
Allowable Sale Quantity	MMBF	32.8	34.8	32.1	29.1	27.2	22.1	25.6
Sawtimber (Softwood)	MMBF	25.3	18.5	24.2	25.9	23.5	17.3	24.6
Sawtimber (Hardwood)	MMBF	6.7	15.5	6.8	2.1	2.5	3.8	0
Roundwood Products	MMBF	0.8	0.8	1.1	1.1	1.2	1.0	1.0
Fuelwood	MMBF	11.0	9.1	9.0	8.8	8.5	7.5	8.0
Reforestation	ACRES	1368	344	589	5855	2210	3017	605
TSI	ACRES	3585	4034	3290	1138	900	1105	165
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	5.1	9.7	8.0	6.3	7.5		
Increased Yield Over Natural-Colorado River	M AC.FT.	1.3	3.3	2.7	1.9	2.6		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	11418	7405	7426	6862	5866		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE 1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	730	786	726	701	691		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES	2	2	2	2	2		
Soils								
Soil & Water Resource Imp.	ACRES	101	162	39	19	19		
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	24	28	15	9	5		
Reconstruction	MILES	46	25	27	30	28		
Trail Construction/Rconstruction	MILES	0	0	0	0	0		
BENEFITS M$								
Recreation								
Developed		1507	1615	2734	2180	4791		
Dispersed		4174	5857	5655	6830	8104		
Wilderness		60	66	803	95	128		
Total		5741	7538	8469	9105	13023		
Range		959	967	975	983	991		
Timber		1790	598	851	746	398		
Wildlife		5632	5969	5930	5841	5921		
Water Yield		298	566	467	368	438		
Minerals		2536	2641	2605	2487	2422		
Other		21	21	21	21	21		
Total		16977	18300	19318	19551	23214		
RECEIPTS M$								
Recreation - Developed		166	177	291	234	499		
Range		120	121	122	123	124		
Timber		1777	585	838	733	385		
Minerals		13	14	13	13	13		
Other		21	21	21	21	21		
Total		2097	918	1285	1124	1042		
COSTS M$								
Timber		2453	1813	1564	2933	1603		
Roads (Appropriated)		24	24	24	24	24		
Recreation		991	673	2352	1601	1161		
Wildlife		168	135	174	179	182		
Range		455	521	543	548	557		
Protection		692	713	683	683	683		
Other		2569	2565	2853	2829	3631		
Total Forest Budget		7352	6444	8193	8797	7841		
O&M		4620	4592	4942	5222	6093		
Investment		2732	1852	3251	3575	1748		
Non-Forest Service Costs (Purchaser Const. Roads)		245	225	133	95	67		
Returns to Treasury		2097	918	1285	1124	1042		

TABLE BVI-8a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

	DECADE				
ALTERNATIVE G - 1980 RPA	1	2	3	4	5
Timber					
Costs	2698	2038	1697	3028	1670
Benefits	1790	598	851	746	398
Net Benefits	-908	-1440	-846	-2282	-1272
Receipts	1777	585	838	733	385
Net Receipts	-921	-1453	-859	-2295	-1285
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	991	673	2353	1601	1161
Benefits	5741	7538	8469	9105	13023
Net Benefits	4750	6865	6117	7504	11862
Receipts	166	177	291	234	499
Net Receipts	-825	-496	-2061	-1367	-662
Non-Cash Benefits	5575	7361	8178	8871	12524
Wildlife					
Costs	168	135	174	179	182
Benefits	5632	5969	5930	5841	5921
Net Benefits	5464	5834	5756	5662	5739
Receipts	0	0	0	0	0
Net Receipts	-168	-135	-174	-179	-182
Non-Cash Benefits	5632	5969	5930	5841	5921
Range					
Costs	455	521	543	548	557
Benefits	959	967	975	983	991
Net Benefits	504	446	432	435	434
Receipts	120	121	122	123	124
Net Receipts	-335	-400	-421	-425	-433
Non-Cash Benefits	839	846	853	860	867
Other					
Costs	3285	3302	3560	3536	4338
Benefits	2855	3228	3093	2876	2881
Net Benefits	-430	-74	-467	-660	-1457
Receipts	34	35	34	34	34
Net Receipts	-3251	-3267	-3526	-3502	-4304
Non-Cash Benefits	2821	3193	3059	2842	2847
Total					
Costs	7597	6669	8326	8892	7908
Benefits	16977	18300	19318	19551	23214
Net Benefits	9380	11631	10992	10659	15306
Receipts	2097	918	1285	1124	1042
Net Receipts	-5500	-5751	-7041	-7768	-6866
Non-Cash Benefits	14880	17382	18033	18427	22172

a. All tentatively suitable lands may be used for timber production purposes. The exclusions are lands already withdrawn from timber production by legislation or formal withdrawal by the Secretary or Chief. The exclusions include such areas as designated Wilderness, and Research Natural Areas.

b. Utilization of timber products to include trees five inch dbh and larger.

c. The state of vegetation in harvested areas, necessary before harvest of adjacent stands, is the existence of established seedlings in appropriate numbers.

d. Openings created by application of even-aged management will not generally exceed 100 acres and will average about 40 acres.

e. Existing and new logging technology will be applied throughout the Forest beginning in the second decade.

f. Aspen will be harvested in ever increasing amounts beginning in the second decade until accessible merchantable volumes are harvested.

g. The average rotation age for timber will be reduced to 109 years.

h. Sales schedules will not be constrained by nondeclining yield, and substantial reductions in sale offerings can be expected in years beyond 2030 resulting from high volume harvests in the early decades.

i. There may be an increase in the genetic tree improvement program, but the benefits may be delayed until improved stock reaches merchantable size.

j. Unit costs for many activities will be lower than for other alternatives because of:

1. Economics of scale.
2. Improved utilization and increased harvest from riparian areas.
3. Increased evenaged management unit size.
4. Greater proportions of drainages can be logged using new technologies.

k. Greater utilization of transportation system will reduce the cost of construction and maintenance per unit of timber sold. Road maintenance costs will increase.

-Treat backlog of watershed restoration needs.
-Maintain restrictions for mineral leasing activities. Provide prompt responses to mining industry requests.
-Provide cost efficient fire suppression.

High timber objectives established by Region 4 made achievement of a feasible solution in FORPLAN difficult. A series of runs was made to come as close to the original objectives as possible as time and cost would allow.

FORPLAN RUN #1:

FORPLAN Objective Function

Maximize PNV for 17 periods

Non FORPLAN Constraints

Standards and guidelines for those Management Prescriptions applied to the alternative.

FORPLAN Constraints Not Common To All Alternatives

a. Objectives for hardwood and softwood sawtimber (discretionally constraint).

	Hardwood	Softwood
Decade 1	1,600 MCF	61,000 MCF
2	6,200 MCF	70,000 MCF
3	9,000 MCF	70,000 MCF
4	9,000 MCF	70,000 MCF
5	10,200 MCF	83,800 MCF

b. Non-declining yield constraint applied

Result of this run was infeasible.

FORPLAN Run #2:

FORPLAN Objective Function

Maximize PNV for 17 periods

Non FORPLAN Constraints

Standards and Guidelines for those Management Prescriptions applied to the alternative.

FORPLAN Constraints Not Common To All Alternatives

a. Objectives for hardwood and softwood sawtimber for first two decade (discretionary constraint).

	Hardwood	Softwood
Decade 1	1,600MCF	61,000MCF
Decade 2	6,200MCF	70,000MCF

b. Sequential upper and lower bounds of 25% (harvest levels from a decade to the next decade may rise or fall 25%). Applied periods 3 - 17.

Result of this run was infeasible.

TABLE BVI-9
RESOURCE OUTPUTS, ACTIVITIES, COSTS AND BENEFITS FOR ALTERNATIVE H HIGH PRODUCTIVITY

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Recreation								
Developed Recreation Use	MRVD	466	644	539	1275	2012		
Rural ROS		256	354	297	446	704		
Road Natural ROS		210	290	243	829	1308		
Dispersed Recreation Use	MRVD	761	1057	1694	2646	3846		
Primitive ROS								
Semi-Primitive Non-Motor ROS		111	149	240	374	508		
Semi-Primitive Motorized ROS		238	320	513	802	1088		
Road Natural ROS		357	480	770	1202	1633		
Rural ROS		55	107	171	267	617		
Dispersed Recreation Use (Wild.)	MRVD	5	6	5	13	20		
Primitive ROS		5	6	5	13	20		
Semi-Primitive Non-Motor ROS								
Wilderness								
Wilderness Management	MACRES	83	83	83	83	83		
Wildlife								
Structural Habitat Improvement-(Terrestrial)	STRUCTS	17	17	19	21	21		
Structural Habitat Improvement-Aquatic	STRUCTS	52	52	52	52	52		
Nonstructural Habitat Improvement-Terrestrial	ACRES	647	585	546	507	468		
Nonstructural Habitat Improvement-Aquatic	ACRES	183	165	154	143	132		
Wildlife and Fish Use	MWFUD	150	174	171	168	159		
Range								
Grazing Use (Livestock)	MAUM	122	130	133	136	139		
Wild Horses & Burros	MAUM	0.3	0.3	0.3	0.3	0.3		
Timber								
Allowable Sale Quantity	MMCF	6.4	4.8	4.8	6.0	7.5	1.9	5.7
Allowable Sale Quantity	MMBF	33.7	25.4	26.8	32.1	39.4	9.3	17.5
Sawtimber (Softwood)	MMBF	31.3	11.1	20.9	28.4	34.2	6.9	16.4
Sawtimber (Hardwood)	MMBF	1.7	13.2	4.8	2.6	4.0	2.2	0.1
Roundwood Products	MMBF	0.7	1.1	1.1	1.1	1.2	0.2	1.0
Fuelwood	MMBF	6.0	4.2	6.1	3.4	7.3	1.0	2.5
Reforestation	ACRES	1060	259	663	6209	3010	405	1423
TSI	ACRES	2635	3970	4147	0	0	0	0
Water								
Meeting Water Quality Goals	%	98	98	98	100	100		
Increased Yield Over Natural-Forest-Wide	M AC.FT.	4.4	9.0	7.3	6.0	7.4		
Increased Yield Over Natural-Colorado River	M AC.FT.	1.1	2.7	2.1	1.8	2.7		
Protection								
Fuelbreaks and Fuel Treatment	ACRES	5912	4401	6387	7460	8327		

OUTPUT/ACTIVITY	UNIT OF MEASURE	DECADE						
		1	2	3	4	5	10	15
Minerals								
Mineral Leases and Permits	CASES	730	786	726	701	691		
HC&D								
Human Resource Programs	EN.YEARS	20	20	20	20	20		
Lands								
Land Pur., Acq., & Exchange	CASES	2	2	2	2	2		
Soils								
Soil & Water Resource Imp.	ACRES	63	85	101	90	70		
Facilities								
Arterial and Collector Roads Construction/Reconstruction	MILES	2	1	1	1	1		
Local Roads								
Construction	MILES	31	28	13	5	5		
Reconstruction	MILES	55	25	22	26	27		
Trail Construction/Rconstruction	MILES	2	2	2	2	2		
BENEFITS M$								
Recreation								
Developed		1654	2285	1912	4522	7133		
Dispersed		5975	7087	9191	11956	15608		
Wilderness		77	103	163	254	345		
Total		7706	9475	11266	16732	23086		
Range		983	1048	1072	1096	1120		
Timber		1753	532	696	924	468		
Wildlife		5632	5713	5483	5144	4937		
Water Yield		257	525	426	350	432		
Minerals		2463	2644	2605	2486	2422		
Other		21	21	21	21	21		
Total		18815	19958	21569	26753	32486		
RECEIPTS M$								
Recreation - Developed		181	245	207	472	747		
Range		123	131	134	137	140		
Timber		1740	519	683	911	455		
Minerals		13	14	13	13	13		
Other		21	21	21	21	21		
Total		2078	930	1058	1554	1376		
COSTS M$								
Timber		1865	1018	1202	2463	1697		
Roads (Appropriated)		48	24	24	24	24		
Recreation		479	483	618	675	531		
Wildlife		176	177	132	247	191		
Range		694	756	774	573	597		
Protection		686	349	349	349	349		
Other		2539	3094	3099	3365	3706		
Total Forest Budget		6487	5901	6198	7696	7095		
O&M		4510	4564	4611	4879	5102		
Investment		1977	1337	1587	2817	1993		
Non-Forest Service Costs (Purchaser Const. Roads)		276	135	127	103	90		
Returns to Treasury		2078	930	1058	1554	1376		

TABLE BVI-9a
AVERAGE ANNUAL CASH FLOWS AND NON-CASH BENEFITS *
(Thousands of 1978 Dollars Inflated to 1/1/82)

	DECADE				
ALTERNATIVE H - HIGH PRODUCTIVITY	1	2	3	4	5
Timber					
Costs	2141	1153	1329	2566	1787
Benefits	1753	532	696	924	468
Net Benefits	-388	-621	-633	-1642	-1319
Receipts	1740	519	683	911	455
Net Receipts	-401	-634	-646	-1655	-1332
Non-Cash Benefits	13	13	13	13	13
Recreation					
Costs	479	483	618	675	531
Benefits	7706	9475	11266	16732	23086
Net Benefits	7227	8992	10648	16057	22555
Receipts	181	245	207	472	747
Net Receipts	-298	-238	-411	-203	216
Non-Cash Benefits	7525	9230	11059	16260	22339
Wildlife					
Costs	176	177	132	247	191
Benefits	5632	5713	5483	5144	4937
Net Benefits	5456	5536	5351	4897	4746
Receipts	0	0	0	0	0
Net Receipts	-176	-177	-132	-247	-191
Non-Cash Benefits	5632	5713	5483	5144	4937
Range					
Costs	694	756	774	573	597
Benefits	983	1048	1027	1096	1120
Net Benefits	289	292	298	523	523
Receipts	123	131	134	137	140
Net Receipts	-571	-625	-640	-436	-457
Non-Cash Benefits	860	917	938	959	980
Other					
Costs	3273	3467	3472	3738	4079
Benefits	2741	3190	3052	2857	2875
Net Benefits	-532	-277	-420	-881	-1204
Receipts	34	35	34	34	34
Net Receipts	-3239	-3432	-3438	-3704	-4045
Non-Cash Benefits	2707	3155	3018	2823	2841
Total					
Costs	6763	6036	6325	7799	7185
Benefits	18815	19958	21569	26753	32486
Net Benefits	12052	13922	15244	18954	25301
Receipts	2078	930	1058	1554	1376
Net Receipts	-4685	-5106	-5267	-6245	-5809
Non-Cash Benefits	16737	19028	20511	25199	31110

FORPLAN RUN #3

FORPLAN Objective Function

Maximize softwood sawtimber production for 5 periods, rolled over to maximize PNV for 17 periods.

Non FORPLAN Constraints

Standards and guidelines for those management prescriptions applied to the alternative.

FORPLAN Constraints Not Common To All Alternatives

a. Objectives for hardwood sawtimber applied to first 2 decades and softwood sawtimber for first decade (discretionary constraint).

	Hardwood	Softwood
Decade 1	1,600 MCF	61,000 MCF
Decade 2	6,200 MCF	

b. Sequential upper and lower bounds of 25% applied in all periods.

Result of run was feasible.

The following table (BVI-10) displays the acreage assignment by management area prescription for each Forest planning alternative. These management area prescriptions, along with their standards and guidelines, form the basis for constraints on management emphasis in FORPLAN (available and tentatively suitable Forest land only) and resources modeled outside of FORPLAN including priced and non-priced outputs and cost estimates.

TABLE BVI-10
ACREAGE ASSIGNMENT BY MANAGEMENT PRESCRIPTION FOR EACH ALTERNATIVE
(M Acres)

Mgmt. Area Presc.	Emphasis	Alternatives A	B	C	D	E	F	G	H
1A	National Forest Recreation Sites.	17.4	19.4	14.7	17.4	4.6	5.0	11.2	13.7
1B	Existing winter sports sites.	3.8	3.8	3.3	3.8	2.2	3.8	3.4	3.7
2A	Semi-primitive recreation opportunities.	88.8	222.3	73.6	88.8	391.0	71.0	85.0	46.9
2B	Roaded natural and rural recreation opportunities. Maintained or improved improved visual quality on major travel routes.	114.5	131.7	15.6	114.5	224.8	20.9	14.1	0
4A	Fish habitat increase water quality and stream channel enhancement for fish habitat.	3.8	1.1	1.1	3.8	1.4	0.1	1.4	1.1
4B	Wildlife habitat management for one or more management indicator species. Livestock grazing will be compatible with wildlife habitat management.	14.3	36.7	0	14.3	432.4	0	15.5	0

Mgmt. Area Presc.	Emphasis	A	B	C	D	E	F	G	H
4C	Wildlife habitat improvement. Vegetation treatment in hardwood and shrub dominated land. Livestock grazing will be compatible with wildlife habitat management.	0	72.9	0	0	0	0	0	0
4D	Wildlife habitat management. Livestock grazing will be compatible with wildlife habitat management. Clearcut aspen only.	0	10.5	0	0	45.0	0	4.1	0
5A	Big game winter range in non-forest areas. Travel management prevents unacceptable stress. Livestock grazing managed to favor wildlife habitat.	112.8	313.6	31.4	112.8	214.6	40.9	113.2	40.9
5B	Big game winter range in forest areas. Travel management prevents unacceptable stress. Vegetation treatment will enhance plant and animal diversity. Livestock grazing managed to favor wildlife habitat.	0	23.6	0	0	0	0	0	0
6A	Livestock grazing. Improve forage composition. Vegetation treatment in mountain grass, meadow, and shrub; oakbrush; and aspen types.	339.9	276.6	465.6	339.9	59.3	939.5	480.0	848.8

Mgmt. Area Presc.	Emphasis	Alternatives A	B	C	D	E	F	G	H
7A	Intensive timber management. Timber harvest in aspen, spruce-fir, ponderosa pine and mixed conifer types. Slopes less than 40 percent.	271.2	270.4	200.4	271.2	130.4	373.7	305.4	590.8
8A	Semi-primitive wilderness setting. Moderate level of solitude. Moderate opportunity for challenge, risk, and self-reliance.	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0
8A1	Antone Bench Exclusion	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
8A2	Other Box-Death Hollow Exclusions	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
9A	Riparian area management. Limits utilization of resources. One hundred feet from perennial stream edges, high water marks of lakes and wetlands.	18.3	7.6	1.1	18.3	11.1	0	6.3	0
9B	Intensive riparian area management.	1.10	1.6	0.08	0.10	11.1	0.5	0	0
10A	Research Natural Areas.	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
10E	Municipal Watersheds.	24.0	9.1	19.4	24.9	21.5	9.7	23.8	8.8
1.	General Forest Direction	785.1	393.0	969.8	785.1	249.3	330.1	734.6	239.7

TOTAL - 1,883.676 M ACRES

VII. ESTIMATING EFFECTS OF BENCHMARKS, ALTERNATIVES, AND DISCRETIONARY CONSTRAINTS

A. Introduction

NFMA regulations (36 CFR 219.12 (g)) require that "the physical, biological, economic and social effects of implementing alternatives shall be displayed and compared in the environmental statement." The purpose of land and resource management planning is to produce a land management plan that provides for multiple use and sustained yields of goods and services from the Dixie National Forest, in a manner that maximized long-term net public benefits in an environmentally sound manner. Priced yields, non-priced yields, and environmental effects had to be calculated and compared before an alternative could be selected which best met the objectives of land and resource management planning.

B. Evaluation of 90% of LRSY Growth Constraint

Since version II of FORPLAN does not have the ability to calculate growth of timber stands, an analysis of having the stands growth rate at or above 90% of the stands potential by the year 2030 is not possible. An analysis of Rudy Vershoor's paper on Evaluating the 90% of LRSY Growth Constraint in Forest Planning, shows that for the Dixie, with uneven age class distribution, the 90% of LRSY requirement may not be appropriate. The Dixie has an abundance of stands in the 60 to 90 year age classes, and very few stands in ages 40 or less.

In order to meet the growth at 90% of LRSY, much greater levels of thinning and stand density control would be needed, as well as much more planting. This would cause a drop in PNV due to greatly increased costs of doing the additional work being applied to revenues that would increase very little. The net return to the U.S. Treasury would also be less.

C. Cost Effectiveness of Constraints

As discussed in Appendix B, VI, some common constraints were used in the Dixie's Analysis of benchmarks and alternatives. These were designed to meet legal and/or 36 CFR219 requirements, and therefore, were not considered optional. No "sensitivity" analysis was done for these common constraints.

The constraints used to reach individual benchmark and alternative objectives were not subjected to formal sensitivity analysis due to cost, and time. However, the effects of these sets of constraint application can readily be seen by comparing the output levels and costs between alternatives.

Table BVII-1, compares resource yields, activities, costs, and benefits for all alternatives and benchmarks. All comparisons are made with the output, activity or cost of the first decade of the Current Program Alternative.

Table BVII-2, displays the increasing present value of costs and non-priced outputs by alternative or benchmark.

Table BVII-3, displays the decreasing present net value and priced outputs by alternative or benchmark.

TABLE BVII-1
RESOURCE OUTPUTS, ACTIVITIES, COSTS, AND BENEFITS COMPARED TO THE FIRST DECADE*
OF THE CURRENT PROGRAM ALTERNATIVE BY BENCHMARKS AND ALTERNATIVES

OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	BENCHMARKS					ALTERNATIVES						
				MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Recreation															
Developed Rec. Use (inc. VIS) (R)	MRVD														
Decade 1		186	0	-94	+120	+20	+75	+75	+75	-38	+70	+57	+175	+48	+70
2			+70	-94	+243	+243	+172	+172	+172	-34	+72	+103	+172	+64	+168
3			+197	-94	+253	+126	+397	+397	+397	-17	+93	+221	+397	+238	+111
4			+324	-94	+253	+126	+879	+723	+723	+13	+103	+221	+879	+152	+260
5			+618	-94	+253	+126	+1361	+919	+919	+43	+113	+372	+1361	+557	+518
Developed Rec. Use (inc. VIS) (RN)	MRVD														
Decade 1		280	0	-280	-58	-58	-67	-67	-67	-159	-70	-81	-67	-89	-70
2			+105	-280	+31	-56	+18	+13	+13	-155	-71	-44	+13	-75	+10
3			+295	-280	+31	-56	+197	+197	+197	-142	-52	+53	+197	+67	-37
4			+485	-280	+38	-54	+591	+463	+463	-117	-44	+150	+591	-3	+549
5			+22	-280	+38	-54	+986	+563	+524	-93	-36	+176	+986	+328	+1028
Dispersed Rec. Use (SPNM)	MRVD														
Decade 1		110	0	+190	+26	-69	-44	+4	+13	-7	+4	+10	-44	-23	+1
2			+39	+220	+56	-55	-32	+41	+82	+49	+41	+78	-32	-15	+39
3			+129	+250	+93	-25	+38	+132	+148	+80	+132	+145	+38	-22	+130
4			+263	+250	+137	+21	+102	+266	+302	+173	+266	+299	+102	+27	+264
5			+398	+250	+192	+92	+154	+400	+456	+265	+400	+453	+154	+76	+398
Dispersed Rec. Use (SPM)	MRVD														
Decade 1		236	0	-236	+54	-153	-71	+8	-31	-15	+8	+83	-71	-49	+2
2			+84	-236	+121	-125	-41	+88	+84	+105	+88	+266	-41	-32	+84
3			+277	-236	+199	-66	+134	+282	+194	+170	+282	+444	+134	-47	+277
4			+564	-236	+294	+26	+294	+569	+451	+368	+569	+855	+294	+58	+566
5			+852	-236	+410	+167	+424	+856	+708	+567	+856	+1266	+424	+153	+852
Dispersed Rec. Use Other (RN)	MRVD														
Decade 1		355	0	-355	+80	+224	-25	+11	+14	+13	+11	-76	-25	-80	+2
2			+125	-355	+180	+419	+36	+131	+220	+213	+131	+85	+36	-49	+125
3			+414	-355	+297	+838	+384	+421	+420	+322	+421	+240	+384	-71	+415
4			+846	-355	+440	+1477	+706	+852	+882	+652	+852	+600	+706	+86	+847
5			+1279	-355	+615	+2468	+966	+1283	+1345	+984	+1283	+959	+966	+243	+1278

OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	BENCHMARKS					ALTERNATIVES						
				MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Dispersed Rec. Use Other (R)	MRVD														
Decade 1		79	0	-79	+3	+45	+20	+2	+27	-40	+2	+1	+20	-16	-24
2			+28	-79	+40	+87	+38	+29	+87	-22	+30	+47	+38	-11	+28
3			+92	-79	+65	+176	+142	+94	+145	-11	+94	+91	+142	-16	+92
4			+188	-79	+98	+314	+239	+189	+276	+22	+190	+194	+239	+19	+188
5			+284	-79	+137	+526	+317	+285	+410	+55	+285	+297	+317	+54	+538
Wilderness															
Wilderness Mgt.	M Acres														
Decade 1		83	0	0	0	0	0	0	0	0	0	0	0	0	0
2			0	0	0	0	0	0	0	0	0	0	0	0	0
3			0	0	0	0	0	0	0	0	0	0	0	0	0
4			0	0	0	0	0	0	0	0	0	0	0	0	0
5			0	0	0	0	0	0	0	0	0	0	0	0	0
Dispersed Rec. Use Wilderness (P)	MRVD														
Decade 1		8	0	+47	+35	-4	0	-4	0	0	0	0	0	-2	-3
2			+3	+67	+35	-4	+2	-1	+5	+4	+3	+5	+2	-1	-2
3			+9	+82	+35	-4	+8	+2	+9	+6	+9	+9	+9	+1	-3
4			+19	+82	+35	-4	+15	+9	+19	+12	+19	+19	+15	+2	+5
5			+28	+82	+35	-4	+20	+17	+30	+19	+24	+30	+20	+5	+12
Wildlife															
Structural Habitat Terrestrial	Struc.														
Decade 1		10	0	-10	-1	+4	0	+5	+9	-8	0	+1	0	+2	+7
2			+2	-10	0	+2	0	+16	+10	-8	0	+6	0	+3	+7
3			+2	-10	0	-1	0	+22	+11	-8	-2	+7	0	+6	+9
4			+2	-10	0	-2	0	+22	+12	-8	-4	+7	0	+6	+11
5			+2	-10	+1	-4	0	+23	+13	-8	-5	+8	0	+6	+11
Nonstructural Habitat Imp. Terrestrial	Acres														
Decade 1		850	0	-850	-220	-450	-850	+1280	+1190	-800	-210	+780	-185	-170	-203
2			-10	-850	-192	-450	-850	+1700	+1242	-800	-230	+1050	-250	-45	-265
3			-10	-850	-154	-450	-850	+1802	+1295	-800	-250	+1052	-290	-47	-304
4			-30	-850	-229	-450	-850	+1802	+1352	-800	-290	+1052	-330	-45	-343
5			-30	-850	-229	-450	-850	+1802	+1405	-800	-370	+1052	-370	-44	-382

OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	BENCHMARKS					ALTERNATIVES						
				MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Structural Habitat Imp. Aquatic	Struc.														
Decade 1		20	0	-20	0	-13	-20	+19	+115	-15	0	+19	+15	+19	+32
2			+5	-20	+9	-13	-20	+24	+122	-15	0	+24	+15	+31	+32
3			+5	-20	-1	-13	-20	+13	+125	-15	0	+13	+15	+21	+32
4			+5	-20	-9	-13	-20	-5	+128	-15	0	+10	+15	+31	+32
5			+5	-20	-9	-13	-20	-5	+133	-15	0	+10	+15	+36	+32
Nonstructural Hab. Imp. Aquatic	Acres														
Decade 1		100	0	-100	+110	-25	-100	+130	+400	-100	+60	+130	+65	+110	+83
2			+10	-100	+132	-36	-100	+130	+410	-100	+55	+130	+50	+151	+65
3			+10	-100	+120	-29	-100	+45	+420	-100	+50	+45	+40	+151	+54
4			+30	-100	+107	-36	-100	+50	+430	-100	+40	+35	+30	+151	+43
5			+30	-100	+107	-42	-100	+50	+440	-100	+20	+20	+20	+152	+32
Wildlife and Fish Use	MWFUD														
Decade 1		171	0	0	-1	-6	0	-1	+9	-32	+4	+12	-16	+12	-21
2			+12	-17	+1	-59	-17	+17	+31	-18	+1	+40	+15	+33	+3
3			+11	-33	-3	-87	-33	+14	+26	-25	-3	+33	+13	+27	0
4			+9	-46	-4	-104	-46	+13	+31	-26	-5	+40	+12	+33	-3
5			+8	-45	-4	-113	-45	+14	+31	-26	-7	+40	+11	+33	-12
Range															
Grazing Use (livestock)	M AUM														
Decade 1		115	0	-115	+2	+4	-5	-5	0	-5	0	-25	+2	+4	+7
2			0	-115	+2	+9	-8	-8	0	-8	0	-25	+2	+5	+15
3			0	-115	+2	+15	-10	-10	0	-10	0	-25	+2	+6	+18
4			0	-115	+2	+22	-12	-12	0	-12	0	-25	+2	+7	+21
5			0	-115	+2	+28	-15	-15	0	-15	0	-25	+2	+8	+24
Wild Horses and Burros	M AUM														
Decade 1		0.3	0	0	0	0	0	0	0	0	0	0	0	0	0
2			0	0	0	0	0	0	0	0	0	0	0	0	0
3			0	0	0	0	0	0	0	0	0	0	0	0	0
4			0	0	0	0	0	0	0	0	0	0	0	0	0
5			0	0	0	0	0	0	0	0	0	0	0	0	0

OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	BENCHMARKS					ALTERNATIVES						
				MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Timber															
Allowable Sale Qnty	MMCF														
Decade 1		5.1	0	-5.1	+1.0	-1.1	-4.0	-4.0	0	-0.6	+0.5	-0.4	+0.8	+1.5	+1.3
2			+0.1	-5.1	+1.1	-1.9	-4.0	-4.0	+0.1	-0.6	+0.5	+0.1	+0.8	+1.8	-0.3
3			+0.2	-5.1	+1.1	-1.7	-2.2	-2.2	+0.2	-0.6	+0.5	+0.2	+0.9	+1.1	-0.3
4			+0.2	-5.1	+1.1	+0.5	-2.2	-2.2	+0.2	-0.6	+0.5	+0.2	+0.9	+0.6	+0.9
5			+0.3	-5.1	+1.2	-2.4	-1.9	-1.9	+0.3	-0.6	+0.5	+0.2	+0.9	+0.3	+2.4
10			+0.3	-5.1	+1.2	-2.0	-1.9	-1.9	+0.3	-0.6	+0.5	+0.2	+0.9	+0.2	+3.2
15			+0.3	-5.1	+1.2	-0.8	-1.9	-1.9	+0.3	-0.6	+0.5	+0.2	+0.9	+0.2	+0.6
Allowable Sale Qnty	MMBF														
Decade 1		26.4	0	-26.4	+4.8	-6.4	-21.4	-21.4	0	-4.0	+0.6	+4.9	+2.3	+6.4	+7.3
2			-0.4	-26.4	+4.9	-9.9	-21.1	-21.1	-0.4	-2.9	+2.0	-2.4	+4.3	+8.4	-1.0
3			-0.1	-26.4	+7.6	-9.3	-9.4	-9.4	-0.1	-2.0	+2.8	-1.9	+5.2	+5.7	+0.4
4			0	-26.4	+5.1	-2.7	-12.1	-12.1	0	-1.9	+2.5	-1.5	+4.4	+2.7	+5.7
5			0	-26.4	+4.8	-11.9	-11.6	-11.6	0	-3.6	+1.8	-2.7	+3.7	+0.8	+13.0
10			-3.9	-26.4	-0.2	-12.7	-11.0	-11.0	-3.9	-7.3	-3.4	-5.2	-2.0	-4.3	-17.1
15			-2.0	-26.4	+2.7	-4.3	-14.3	-14.3	-2.0	-2.0	+1.0	-2.8	+1.4	-0.8	-8.9
Sawtimber (softwood)	MMBF														
Decade 1		22.9	0	-22.9	+4.8	-10.7	-18.2	-18.2	0	-8.8	-3.2	-7.4	-4.1	+2.4	+8.4
2			-7.2	-22.9	-8.6	-12.6	-18.4	-18.4	-7.2	-7.6	-5.5	-11.5	-3.1	-4.4	-11.8
3			-8.0	-22.9	+8.2	-12.4	-6.3	-6.3	-8.0	-3.9	+0.9	-9.2	+1.6	+1.3	-2.0
4			-5.5	-22.9	-1.7	-6.0	-10.9	-10.9	-5.5	-1.7	-2.0	-8.4	+2.6	+3.0	+5.5
5			-1.6	-22.9	+1.4	-9.9	-13.2	-13.2	-1.6	-6.8	+0.3	-7.4	+0.5	+0.6	+11.3
10			-3.4	-22.9	-2.9	-10.1	-10.3	-10.3	=3.4	-8.0	-4.9	-11.3	-2.7	-5.6	-16.0
15			-2.4	-22.9	-0.7	-4.5	-11.9	-11.9	-2.4	-0.8	-2.6	-11.2	+2.1	+1.7	-6.5
Sawtimber (hardwood)	MMBF														
Decade 1		2.8	0	-2.8	-0.1	+4.2	-2.8	-2.8	0	+5.1	+3.7	+0.7	+6.3	+3.9	-1.1
2			+6.6	-2.8	+13.2	+3.0	-2.3	-2.3	+6.6	+6.0	+7.8	+5.9	+7.1	+12.7	+10.4
3			+7.5	-2.8	-1.0	+3.0	-2.8	-2.8	+7.5	2.2	+1.8	+3.9	+3.2	+4.0	+2.0
4			+5.0	-2.8	+6.3	+3.2	-0.9	-0.9	+5.0	+0.1	+4.4	+3.4	+1.3	-0.7	-0.2
5			+0.9	-2.8	+2.8	-2.1	+1.9	+1.9	+0.9	+3.4	+1.4	+1.1	+2.6	-0.3	-1.2
10			-0.9	-2.8	+2.4	-2.7	-0.4	-0.4	-0.9	+1.0	+1.4	+2.8	+0.4	+1.0	-0.6
15			-0.1	-2.8	+2.9	-0.1	-2.0	-2.0	-0.1	-1.8	+3.3	+5.1	-1.2	-2.8	-2.7
Roundwood Products	MMBF														
Decade 1		0.7	0	-0.7	+0.1	+0.1	-0.4	-0.4	0	-0.3	+0.1	+1.8	+0.1	+0.1	0
2			+0.2	-0.7	+0.3	-0.3	-0.4	-0.4	+0.2	-0.3	-0.3	+3.2	+0.3	+0.1	+0.4
3			+0.4	-0.7	+0.4	+0.1	-0.3	-0.3	+0.4	-0.3	+0.1	+3.4	+0.4	+0.4	+0.4
4			+0.5	-0.7	+0.5	+0.1	-0.3	-0.3	+0.5	-0.3	+0.1	+3.5	+0.5	+0.4	+0.4
5			+0.7	-0.7	+0.6	+0.1	-0.3	-0.3	+0.7	-0.2	+0.1	+3.6	+0.6	+0.5	+0.5
10			+0.4	-0.7	+0.3	+0.1	-0.3	-0.3	+0.4	-0.3	+0.1	+3.3	+0.3	+0.3	-0.5
15			+0.5	-0.7	+0.5	+0.3	-0.4	-0.4	0.5	-0.3	+0.3	+3.3	+0.5	+0.3	+0.3

				BENCHMARKS					ALTERNATIVES						
OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Fuelwood	MMBF														
Decade 1		10.7	0	-10.7	-3.2	-0.6	-9.1	-9.1	0	-3.1	-0.6	-3.2	-0.8	+0.3	-4.7
2			-2.3	-10.7	-6.0	-3.5	-9.1	-9.1	-2.3	-5.2	-3.5	-2.3	-3.6	-1.6	-6.5
3			-2.2	-10.7	-5.0	-3.9	-5.2	-5.2	-2.2	-5.5	-3.9	-2.3	-2.5	-1.7	-4.6
4			-2.7	-10.7	-3.2	-3.0	-5.5	-5.5	-2.7	-4.9	-3.0	-2.3	-2.8	-1.9	-7.3
5			-1.3	-10.7	-1.5	-2.0	-7.0	-7.0	-1.3	-4.1	-2.0	-2.3	-1.1	-2.2	-3.4
10			-2.7	-10.7	-3.2	-3.2	-7.2	-7.2	-2.7	-6.2	-3.2	-2.3	-4.2	-3.2	-9.7
15			-2.6	-10.7	-2.2	-2.2	-7.7	-7.7	-2.6	-5.2	-2.2	-2.3	-3.7	-2.7	-8.2
Reforestation	Acres														
Decade 1		1588	0	0	-389	-1435	-1562	-1562	0	-1273	-758	-1002	-419	+1997	-528
2			-1186	0	-1185	-1429	-1531	-1531	-1186	-913	-1112	-1243	-1175	+2446	-1329
3			-1134	0	-749	-1445	-1419	-1419	-1134	-1210	-868	-907	-907	+1702	-925
4			-1765	0	+2566	-1282	-1481	-1481	+1765	-496	+1053	+89	+3463	-450	+4621
5			+56	0	+611	-974	-1296	-1296	+58	+281	+812	+1226	+249	-688	+1422
10			-206	0	+1094	+1243	+366	+366	-206	+303	+941	-899	+1968	-483	-1183
15			-667	0	-780	-684	-1470	-1470	-667	+511	-382	-859	-1022	-1423	-165
TSI	Acres														
Decade 1		5000	0	0	-2371	-3464	-5000	-5000	0	-4553	-4020	-4963	-4635	-1415	-2365
2			-4946	0	-4390	-4926	-4500	-4500	-4946	-4043	-3444	-4355	-3199	-966	-1030
3			-3231	0	-3152	-4706	-5000	-5000	-3231	-897	-1199	-2829	-1379	-1710	-853
4			-4372	0	-4462	-3893	-4955	-4955	-4372	-3391	-3749	-4373	-3908	-3862	-5000
5			-4750	0	-5000	-4550	-3938	-3938	-4750	-4407	-4736	-4774	-4700	-4100	-5000
10			-4881	0	-3265	-5000	-5000	-5000	-4881	-5000	-4450	-3283	-3612	-3895	-5000
15			-5000	0	-4772	-2480	-3656	-3656	-5000	-5000	-5000	-5000	-5000	-4835	-5000
Water															
Meeting Water Quality Goals	Percent														
Decade 1		98	0	0	0	0	0	0	0	0	0	0	0	0	0
2			0	0	0	0	0	0	0	0	0	0	0	0	0
3			0	0	0	0	0	0	0	0	0	0	0	0	0
4			+2	0	+2	+2	0	+2	+2	0	+2	+2	+2	+2	+2
5			+2	0	+2	+2	0	+2	+2	0	+2	+2	+2	+2	+2
Increased Water Yield Over Natural Forest-Wide	M Ac. Ft.														
Decade 1		4.3	0	-4.3	-0.8	-0.2	-1.7	-1.7	0	+0.3	+0.5	-0.4	+1.2	+0.8	+0.1
2			+4.0	-4.3	+3.6	-0.2	-2.7	-2.7	+4.0	+1.7	+3.3	+1.4	+3.4	+5.4	+4.7
3			+3.8	-4.3	+3.2	-1.0	-3.4	-3.4	+3.8	+0.9	+2.6	+1.3	+3.0	+3.7	+3.0
4			+2.4	-4.3	+3.0	-1.1	-3.3	-3.3	-2.4	+0.9	+2.7	+1.4	+3.0	+2.0	+1.7
5			+1.7	-4.3	+4.0	-1.3	-2.8	-2.8	+1.7	+2.1	+2.7	+1.1	+3.7	+3.2	+3.1

				BENCHMARKS					ALTERNATIVES						
OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Increased Water Yield Over Natural Colorado River	M Ac. Ft.														
Decade 1		1.2	0	-1.2	-0.5	-0.1	-0.7	-0.7	0	0	-0.1	-0.3	+0.2	+0.1	-0.1
2			+1.5	-1.2	+1.0	+0.2	-0.9	-0.9	+1.5	+0.4	+0.8	+0.2	+0.8	+2.1	+1.5
3			+1.4	-1.2	+1.1	0	-0.9	-0.9	+1.4	+0.1	+0.8	+0.2	+0.9	+1.5	+0.9
4			+0.9	-1.2	+1.3	+0.2	-0.6	-0.6	+0.9	+0.4	+1.0	+0.4	+1.2	+0.7	+0.6
5			+0.7	-1.2	+1.4	+0.1	-0.4	-0.4	+0.7	+1.0	+1.3	+0.7	+1.7	+1.4	+1.5
Fuelbreaks and Fuel Treatment	Acres														
Decade 1		10505	0	-10505	-663	-2548	-10505	-8322	0	-3980	-2548	-3730	-2453	+913	-4593
2			-3388	-10505	-4396	-2788	-10505	-9312	-3388	-4947	-2788	-6155	-2338	-3100	-6104
3			-5864	-10505	-4146	-3551	-10505	-9049	-5864	-5428	-3551	-6726	-3070	-3079	-4118
4			-5372	-10505	-4016	-6034	-10505	-4970	-5372	-5792	-6034	-6181	-4246	-3643	-3045
5			-5586	-10505	-4703	-5163	-10505	-8104	-5586	-6718	-5163	-6307	-4558	-4639	-2178
Minerals															
Mineral Leases and Permits	Cases														
Decade 1		690	0	-390	+96	+96	-390	-95	+1	-95	+1	-38	+96	+40	+40
2			+40	-340	+149	+149	-340	-30	+60	-30	+60	+24	+149	+96	+96
3			+60	-380	+89	+89	-380	-90	0	-90	0	-36	+89	+36	+36
4			+60	-400	+84	+84	-400	-115	-25	-115	-25	-61	+84	+11	+11
5			+90	-400	+84	+84	-400	-125	-35	-125	-35	-61	+54	+1	+1
HCAD															
Human Resource Programs	Enr. Yr.														
Decade 1		20	0	-20	0	0	-20	0	0	-18	0	0	0	0	0
2			0	-20	0	0	-20	0	0	-18	0	0	0	0	0
3			0	-20	0	0	-20	0	0	-18	0	0	0	0	0
4			0	-20	0	0	-20	0	0	-18	0	0	0	0	0
5			0	-20	0	0	-20	0	0	-18	0	0	0	0	0
Lands															
Land Pur. & Acq. (exc.)	Cases														
Decade 1		2	0	-2	-2	-2	-2	-2	0	0	0	0	0	0	0
2			0	-2	0	-2	-2	-2	+1	0	-1	0	0	0	0
3			0	-2	0	-2	-2	-2	+1	0	0	+1	+1	0	0
4			0	-2	0	-2	-2	-2	+2	0	-1	0	0	0	0
5			0	-2	0	-2	-2	-2	+2	0	-1	+1	+1	0	0

				BENCHMARKS					ALTERNATIVES						
OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Soils															
Soil & Water Resources Imp.	Acres														
Decade 1		51	0	-51	-5	-5	-51	0	+34	-18	-8	+34	+12	+50	+12
2			+12	-51	+7	+7	-51	+12	+87	-18	-5	+87	+24	+111	+34
3			+29	-51	+7	+7	-51	+29	-16	-18	+17	-16	+41	-12	+50
4			+12	-51	+7	+7	-51	+29	-16	-18	+17	-31	+24	-32	-39
5			-13	-51	-18	-18	-51	-13	-31	-18	-4	-31	-1	-32	+19
Facilities															
Arterial & Collector Roads Construction/Reconstruction	**Miles**														
Decade 1		2	0	-2	0	0	-2	-2	0	-1	0	0	0	0	0
2			-1	-2	-1	-1	-2	-2	-1	-2	-1	-1	-1	-1	-1
3			-1	-2	-1	-1	-2	-2	-1	-2	-1	-1	-1	-1	-1
4			-1	-2	-1	-1	-2	-2	-1	-2	-1	-1	-1	-1	-1
5			-1	-2	-1	-1	-2	-2	-1	-2	-1	-1	-1	-1	-1
Local Road Construction	**Miles**														
Decade 1		28	0	-28	-11	-11	-23	-23	0	-13	-13	-19	-11	-4	+3
2			-10	-28	-1	-1	-26	-26	-10	-10	0	-9	-1	0	0
3			-13	-28	-4	-4	-26	-26	-14	-11	-8	-17	-4	-13	-15
4			-17	-28	-19	-28	-26	-26	-17	-11	-16	-21	-19	-19	-23
5			-21	-28	-23	-23	-26	-25	-21	-18	-22	-23	-23	-23	-23
Local Road Reconstruction	**Miles**														
Decade 1		32	0	-32	+8	+8	-31	-31	0	+1	+6	-1	+8	+14	+23
2			+2	-32	-5	-5	-31	-31	+2	-9	-6	-14	-5	-7	-7
3			-11	-32	-16	-16	-31	-31	-11	-17	-15	-12	-16	-5	-10
4			-10	-32	-6	-6	-31	-31	-10	-19	-12	-9	-6	-2	-6
5			-10	-32	-4	-4	-31	-31	-11	-16	-17	-9	-4	-4	-5
Trail Construction Reconstruction	**Miles**														
Decade 1		0	0	0	+7	+7	0	0	+33	0	0	+37	+7	0	+2
2			0	0	+7	+7	0	0	+70	0	0	+38	+7	0	+2
3			0	0	+7	+7	0	0	+40	0	0	+38	+7	0	+2
4			0	0	+7	+7	0	0	0	0	0	+33	+7	0	+2
5			0	0	+7	+7	0	0	0	0	0	+33	+7	0	+2

OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	BENCHMARKS					ALTERNATIVES						
				MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Benefits	**, ***														
Recreation Developed	M $														
Decade 1		1929	0	-1916	-64	+247	+33	+1	+32	-816	+1	-98	+33	-422	-275
2			+725	-1916	+695	+773	+765	+765	+765	-782	+9	+244	+765	-314	+356
3			+2037	-1916	+755	+298	+2457	+2456	+2456	-655	+168	+1131	+2457	+805	-17
4			+3350	-1916	+755	+298	+6085	+4907	+4907	-431	+244	+1131	+6085	+251	+2593
5			+6825	-1916	+755	+298	-287	+6384	+6384	-207	+318	+2268	+9713	+2862	+5204
Dispersed	M $														
Decade 1		6917	0	-3074	+388	+2116	+259	+734	+734	-37	+150	+257	+259	-2743	-942
2			+1370	-2442	+1333	+2712	+824	+3099	+3099	+1333	+1344	+8672	+824	-1060	+170
3			+3948	-1923	+4197	+5598	+4267	+4879	+4879	+1583	+3807	+4416	+4267	-1262	+2274
4			+7852	-1923	+4357	+10994	+6254	+11625	+11625	+4703	+7708	+8592	+6254	-87	+5039
5			+11792	-1923	+12885	+11298	+8431	+13171	13171	+6123	+11676	+12885	+8431	+1187	+8691
Wilderness															
Decade 1		90	0	+517	+318	-42	+1	0	0	-7	0	+1	+1	-30	-13
2			+31	+737	+318	-42	+15	+29	+51	+38	+29	+51	+15	-24	+13
3			+101	903	+318	-42	+92	+100	+100	+61	+100	+100	+92	-10	+73
4			+207	+903	+318	-42	+163	+207	+214	+133	+207	+214	+163	+5	+164
5			+313	+903	+318	-42	+220	+312	+327	+207	+312	+327	+220	+38	+255
Range															
Decade 1		927	0	-927	+16	+32	-40	-40	0	-40	0	-202	+16	+32	+56
2			0	-927	+16	+32	-65	-65	0	-65	0	-202	+16	+40	+121
3			0	-927	+16	+32	-80	-80	0	-80	0	-202	+16	+48	+145
4			0	-927	+16	+32	-97	-97	0	-97	0	-202	+16	+56	+169
5			0	-927	+16	+32	-121	-121	0	-121	0	-202	+16	+64	+193
Timber															
Decade 1		1211	0	-1211	+371	+304	-842	-842	0	-60	+284	+50	+254	+579	+542
2			+46	-1211	-305	-503	-895	-895	+46	-235	-155	-281	-58	-613	-679
3			-247	-1211	+131	-455	-248	-248	-247	-261	-683	-314	-838	-360	-515
4			-699	-1211	-1247	-145	-229	-229	-699	-458	-349	-400	-303	-465	-287
5			-471	-1211	-488	-380	-585	-585	-471	-963	-316	-221	-470	-813	-743
Wildlife	WFUD'S														
Decade 1		5551	0	-711	+80	-844	-711	+93	+114	+80	+86	+92	+80	+81	+81
2			+98	-1198	+160	-2436	-1198	+733	+783	-262	+385	+733	+160	+418	+162
3			+129	-1707	+72	-3321	-1707	+652	+766	-558	-42	+652	+72	+379	-68
4			+159	-2120	+37	-3856	-2120	+627	+783	-602	-70	+627	+37	+290	-407
5			+190	-2092	+53	-4164	-2092	+652	+783	-575	-58	+652	+53	+370	-614

				BENCHMARKS					ALTERNATIVES						
OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Water Yield	M $														
Decade 1		251	0	-251	-47	-12	-99	-99	0	+17	+29	-23	+70	+47	+6
2			+234	-251	+210	-12	-158	-158	+234	+99	+193	+82	+198	+315	+274
3			+222	-251	+187	-58	-199	-199	+222	+53	+152	+76	+175	+216	+175
4			+140	-251	+175	-64	-193	-193	+140	+53	+158	+82	+175	+117	+99
5			+99	-251	+234	-76	-163	-163	+99	+123	+158	+64	+216	+187	+181
Minerals	M $														
Decade 1		2884	0	-1172	+30	+30	-1172	+19	+19	-219	+19	+14	+30	-348	-421
2			+197	-1043	+185	+185	-1043	+198	+198	-119	+198	+194	+185	-243	-240
3			+154	-1043	+142	+142	-1043	+117	+117	-158	+117	+150	+142	-279	-279
4			+15	-1043	+20	+20	-1043	+32	+32	-186	+32	+29	+20	-397	-398
5			-56	-1043	-71	-71	-1043	-59	-59	-184	-59	-62	-71	-462	-462
Other	M $														
Decade 1		21	0	0	0	0	0	0	0	0	0	0	0	0	0
2			0	0	0	0	0	0	0	0	0	0	0	0	0
3			0	0	0	0	0	0	0	0	0	0	0	0	0
4			0	0	0	0	0	0	0	0	0	0	0	0	0
5			0	0	0	0	0	0	0	0	0	0	0	0	0
Total Benefits	M $														
Decade 1		19781	0	-8745	+1092	+1223	-2571	-134	+899	-1082	+569	+91	+743	-2804	-966
2			+2701	-8251	+2612	+748	-1755	+3706	+5176	+7	+2003	+9493	+2105	+1481	+177
3			+6344	-8075	+5818	+2282	+3539	+7677	+8293	-15	+3619	+6009	+6383	-463	+1788
4			+11024	-8488	+4431	+7382	+8820	+16879	+17002	+3115	+7930	+10062	+12447	-230	+6972
5			+18692	-8460	+13702	+7089	+14360	+19591	+20234	+4403	+12031	+15711	+18108	+3433	+12705
Receipts	M $														
Recreation-Developed															
Decade 1		181	0	-168	+21	+21	+3	+3	+3	-71	0	-9	+3	-15	0
2			+63	-168	+98	+67	+66	+66	+66	-68	0	+21	+66	-4	+64
3			+177	-168	+105	+26	+214	+214	+214	-57	+15	+98	+214	+110	+26
4			+291	-168	+105	+26	+529	+517	+427	-38	+21	+133	+529	+53	+291
5			+230	-168	+105	+26	+845	+556	+556	-18	+27	+197	+845	+318	+566
Range	M $														
Decade 1		116	0	-116	+2	+4	-5	-5	0	-5	0	-25	+2	+4	+7
2			0	-116	+2	+9	-8	-8	0	-8	0	-25	+2	+5	+15
3			0	-116	+2	+15	-10	-10	0	-10	0	-25	+2	+6	+18
4			0	-116	+2	+22	-12	-12	0	-12	0	-25	+2	+7	+21
5			0	-116	+2	+28	-15	-15	0	-15	0	-25	+2	+8	+24

				BENCHMARKS					ALTERNATIVES						
OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Timber	M $														
Decade 1		1198	0	-1198	+371	-304	-839	-839	0	-60	+284	+50	+254	+579	+542
2			+46	-1198	-305	-503	-892	-892	+46	-235	-155	-281	-58	-613	-679
3			-247	-1198	+131	-455	-248	-248	-247	-261	-683	-314	-838	-360	-515
4			-699	-1198	-1198	-145	-229	-229	-699	-458	-349	-411	-303	-465	-287
5			-471	-1198	-488	-80	-585	-585	-471	-963	-316	-221	-470	-813	-743
Other	M $														
Decade 1		21	0	0	0	0	0	0	0	0	0	0	0	0	0
2			0	0	0	0	0	0	0	0	0	0	0	0	0
3			0	0	0	0	0	0	0	0	0	0	0	0	0
4			0	0	0	0	0	0	0	0	0	0	0	0	0
5			0	0	0	0	0	0	0	0	0	0	0	0	0
Total Receipts	M $														
Decade 1		1528	0	-1489	+396	-277	-848	-842	+4	-137	+285	+16	+261	+569	+550
2			+110	-1488	-202	-424	-840	-834	+114	-311	-153	-284	+13	-610	-598
3			-68	-1488	+240	-412	-50	-45	-33	-329	-668	-241	-620	-243	-470
4			-406	-1489	-1138	-95	+281	+274	-272	-510	-328	-304	+230	-404	+26
5			-239	-1489	-379	-325	+238	-46	+85	-998	-289	-50	+378	-486	-152
Costs															
Recreation	M $														
Decade 1		640	0	-500	+242	-191	+248	+86	+329	-163	+77	+1664	+242	+351	-161
2			+103	-485	+323	-191	+330	+215	+502	-157	+207	+1070	+323	+33	-157
3			+93	-470	+728	-77	+734	+38	+543	-109	+27	+1377	+341	+1712	+22
4			+192	-470	+1889	-53	+1895	+49	+534	-104	+41	+1371	+1889	+961	+35
5			+13	-470	+2899	+51	+2887	+72	+514	-100	+64	+1468	+2889	+521	-109
Wildlife	M $														
Decade 1		119	0	-119	+25	-49	-52	+74	+256	-67	+7	+103	+25	+49	+360
2			+12	-119	+28	-49	-42	+105	+206	-66	+1	+148	+28	+16	+364
3			+20	-119	+25	-51	-34	+114	+238	-63	-2	+155	+25	+55	+499
4			+17	-119	+29	-51	-16	+135	+187	-60	-6	+190	+29	+60	+556
5			+22	-119	+28	-47	+6	+152	+221	-59	-9	+213	+28	+63	+412
Range	M $														
Decade 1		380	0	-380	+150	+313	-140	-140	+110	-140	-70	-87	+150	+75	+314
2			0	-380	+177	+376	-146	-146	+252	-146	-71	-115	+177	+141	+376
3			+6	-380	+191	+395	-151	-151	+262	-151	-80	-108	+190	+163	+394
4			+2	-380	+198	+195	-156	-156	+191	-156	-113	-105	+198	+168	+193
5			+9	-380	+214	+216	-152	-152	+193	-152	-109	-100	+214	+177	+217

				BENCHMARKS					ALTERNATIVES						
OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPOSITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Timber	M $														
Decade 1		2500	0	-2500	-562	-1548	-2171	-2171	0	-1273	-676	-1272	-793	-47	-635
2			-1173	-2500	-951	-1852	-2270	-2270	-1173	-1168	-784	-1531	-816	-687	-1482
3			-1429	-2500	-1265	-1869	-207	-2207	-1429	-1169	-764	-1435	-749	-936	-1298
4			-519	-2500	-4	-1597	-1632	-1632	-519	-1168	-690	-1142	+287	+433	-37
5			-1186	-2500	-938	-1667	-1919	-1919	-1186	-1169	-701	-937	-1016	+897	-803
Roads (Appropriated)	M $														
Decade 1		48	0	-48	-24	0	+9	+9	-24	0	+135	-24	0	-24	0
2			-24	-48	-24	-19	-24	-25	-48	-24	-25	-24	-24	-24	-24
3			-24	-48	-24	-48	-24	-24	-48	-24	-24	-24	-24	-24	-24
4			-24	-48	-24	-24	-24	-24	-48	-24	-24	-24	-24	-24	-24
5			-24	-48	-24	-24	-24	-24	-48	-24	-24	-24	-24	-24	-24
Protection	M $														
Decade 1		226	0	-36	+464	+444	+459	+460	+147	+131	+4	+131	+548	+466	+460
2			+109	-36	+458	+444	+454	+458	+109	+116	+119	+119	+539	+487	+123
3			+109	-36	+453	+444	+108	+458	+109	+120	+109	+119	+538	+457	+123
4			+109	-36	+458	+444	+108	+458	+109	+120	+119	+119	+539	+457	+123
5			+109	-36	+456	+444	+108	+462	+109	+120	+119	+119	+537	+457	+123
Other	M $														
Decade 1		2310	0	-1935	+131	-1189	-1577	-439	+575	-573	-227	+19	+81	+259	+229
2			-1	-1893	+247	-1031	-1561	-268	+761	-552	-207	-94	+247	+255	+784
3			+16	-1886	+274	-1079	-1505	-171	+208	-575	-240	-67	+324	+543	+789
4			+36	-1880	+672	-833	-1318	+126	+486	-597	-243	-3	+692	+519	+1055
5			+21	-1884	+769	-832	-1457	+321	+482	-609	-231	-29	+742	+1321	+1396
Total Forest Budget	M $														
Decade 1		6223	0	-5518	+426	-2220	-3224	-2121	+1393	-2085	-750	+534	+253	+1129	+264
2			-974	-5461	+258	-2322	-3259	-1931	+609	-7997	-760	-427	+474	+221	-322
3			-1209	-5439	+382	-2285	-3079	-1943	-117	-1971	-974	+17	+645	+1970	-25
4			-187	-5433	+3218	-1919	-1143	-1044	+940	-1989	-916	+406	+3610	+2574	+1473
5			-1036	-5437	+3404	-1859	-551	-1088	+285	-1993	-891	+710	+3370	+1618	+872
Operation & Mtce. Portion of Budget	M $														
Decade 1		3892	0	-3187	+960	-1075	-1325	-313	+976	-908	-331	+1165	+775	+728	+618
2			+79	-3130	+1062	-966	-1268	-155	+1191	-942	-59	+354	+1048	+700	+672
3			+10	-3108	+1038	-909	-1494	-195	+624	-973	-356	+564	+1113	+1050	+719
4			+145	-3102	+2160	-625	-798	+323	+887	-994	-451	+803	+1724	+1330	+987
5			-61	-3106	+2207	-593	-821	+429	+1033	-1029	-397	+913	+2007	+2201	+1210

				BENCHMARKS					ALTERNATIVES						
OUTPUT/ACTIVITY	UNITS	CURRENT PROGRAM FIRST DECADE	ALT. A CURRENT PROGRAM	MINIMUM LEVEL	MAXIMUM TIMBER	MAXIMUM RANGE	PNV MARKET	PNV ASSIGN.	(B) COMPO-SITE	(C) CONSTR. BUDGET	(D) CURRENT BUDGET	(E) NON-MARKET	(F) MARKET	(G) 1980 RPA	(H) HIGH PROD
Investment Portion of Budget	M $														
Decade 1		2331	0	-2331	-534	-1145	-1899	-1808	417	-1177	-419	-631	-522	+401	-354
2			-1053	-2331	-804	-1356	-1991	-1776	-582	-1055	-701	-781	-574	+479	-994
3			-1219	-2331	-656	-1376	-1585	-1748	-741	-998	-618	-547	-468	+920	-744
4			-332	-2331	+1058	-1294	-345	-1367	+53	-995	-465	-397	+1886	+1244	+486
5			-975	-2331	-1197	-1266	+270	-1517	-748	-964	-494	-203	+1363	-583	-338
Non-Forest Service Costs (Purchaser Constructed Roads)	M $														
Decade 1		239	0	-239	-71	-121	-205	-205	0	-96	-80	-116	-63	+6	+37
2			-69	-239	-27	-151	-221	-221	-69	-92	-12	-115	-15	-14	-104
3			-121	-239	-89	-157	-197	-197	-121	-116	-93	-138	-66	-106	-112
4			-139	-239	-112	-122	-145	-145	-139	-124	-140	-119	-149	-144	-136
5			-175	-239	-172	-162	-174	-174	-175	-163	-171	-190	-174	-172	-149
Returns to Treasury	M $														
Decade 1		1528	0	-1489	+396	-277	-848	-842	+4	-137	+285	+16	+261	+569	+550
2			+110	-1488	-202	-424	-840	-834	+114	-311	-153	-284	+13	-610	-598
3			-68	-1488	+240	-412	-50	-45	-33	-329	-668	-241	-620	-243	-470
4			-406	-1489	-1138	-95	+281	+274	-272	-510	-328	-304	+230	-404	+26
5			-239	-1489	-379	-325	+238	-46	+85	-998	-289	-50	+378	-486	-152

* Output, Activity and Dollar Changes from Current Program are expressed on an average annual basis for the decade.

** (1987 Dollars inflated to 1/1/82)

*** Direct comparisons of benefits and costs displayed for individual resource outputs provide general indications of relationships, but may be misleading because some outputs in multiple use management have common costs of production that cannot easily be separated and attributed to individual resources.

TABLE BVII-2
INCREASING PRESENT VALUE COST AND NON-PRICED OUTPUTS
(Millions of 1978 Dollars Inflated to 1/1/82)

Benchmark/ Alternative	PNV	PVC	PVB	VQO Retention M Acres	VQO Partial Retention M Acres	Wildlife Management Emphasis M Acres	Declining Watershed Condition M Acres	Percent of Forest With Moderate or Low Mineral Restrictions	No. Of Deer In 2030 M Deer	No. Of Elk In 2030 M Elk	Jobs Increase or Decrease
Min Level Benchmark	230.30	16.32	246.62								
1990				108	577	0	110	92			N/A
2000				108	577	0	85	92			
2010				108	577	0	70	92			
2020				108	577	0	50	92			
2030				108	577	0	30	92	28.2	2.0	
Difference:	+153.25	+60.04	+213.29								
Max PNV (Mkt) Benchmark	383.55	76.36	459.91								
1990				850	642	131	103	94			N/A
2000				849	633	131	79	94			
2010				847	625	131	56	94			
2020				844	617	131	31	94			
2030				842	609	131	11	94	53.5	1.8	
Difference:	+10.8	+13.49	+24.29								
Max Range Benchmark	394.35	89.85	484.20								
1990				841	617	41	113	92			N/A
2000				829	514	41	113	92			
2010				812	442	41	112	92			
2020				800	370	41	112	92			
2030				583	298	41	112	92	6.7	.45	
Difference:	-51.49	+4.39	-47.10								
Constrained Budget Alternative	342.86	94.24	437.10								
1990				852	633	32.5	113	92			-151
2000				849	625	32.5	113	92			
2010				845	617	32.5	112	92			
2020				844	603	32.5	112	92			
2030				841	592	32.5	112	92	45.5	1.5	
Difference	+115.95	+2.13	+118.08								

Benchmark/ Alternative	PNV	PVC	PVB	VQO Retention M Acres	VQO Partial Retention M Acres	Wildlife Management Emphasis M Acres	Declining Watershed Condition M Acres	Percent of Forest With Moderate or Low Mineral Restrictions	No. Of Deer In 2030 M Deer	No. Of Elk In 2030 M Elk	Jobs Increase or Decrease
Max PNV (Asgn) Benchmark	458.81	96.37	555.18								N/A
1990				850	642	131	103	94			
2000				849	626	131	78	94			
2010				847	614	131	56	94			
2020				844	602	131	31	94	53.5	1.8	
2030				840	588	131	11	94			
Difference	-79.24	+24.69	-54.55								
Current Budget Alternative	379.57	121.06	500.63								+73
1990				850	626	130.9	108	93			
2000				847	614	130.9	97	93			
2010				844	603	130.9	87	93			
2020				841	591	130.9	76	93	51.7	1.8	
2030				837	576	130.9	66	93			
Difference:	+22.77	+5.94	+28.71								
Current Program Alternative	402.34	127.00	529.34								+138
1990				850	629	130.9	102	93			
2000				848	617	130.9	79	93			
2010				844	603	130.9	56	93			
2020				841	591	130.9	33	93	53.5	1.8	
2030				838	578	130.9	11	93			
Difference:	+14.40	+15.22	+29.62								
Non-Market Alternative	416.74	142.22	558.96								+98
1990				854	642	693.4	98	84			
2000				851	630	693.4	66	84			
2010				848	622	693.4	36	84			
2020				845	612	693.4	10	84	56.0	2.3	
2030				843	600	693.4	0	84			
Difference:	-91.86	+2.65	-88.85								

Benchmark/ Alternative	PNV	PVC	PVB	VQO Retention M Acres	VQO Partial Retention M Acres	Wildlife Management Emphasis M Acres	Declining Watershed Condition M Acres	Percent of Forest With Moderate or Low Mineral Restrictions	No. Of Deer In 2030 M Deer	No. Of Elk In 2030 M Elk	Jobs Increase or Decrease
High Productivity Alternative	324.88	144.87	469.75								
1990				831	607	42.0	113	94			+163
2000				803	566	42.0	112	94			
2010				773	521	42.0	112	94			
2020				743	476	42.0	111	94			
2030				710	426	42.0	112	94	45.0	1.5	
Difference:	+94.22	+11.56	+105.78								
Composite Alternative	419.10	156.43	575.53								
1990				850	629	449.2	102	94			+250
2000				848	617	449.2	79	94			
2010				844	603	449.2	56	94			
2020				841	591	449.2	31	94			
2030				778	578	449.2	11	94	53.5	2.0	
Difference:	-67.92	+2.95	-64.97								
Max Timber Benchmark	351.18	159.38	510.56								
1990				825	617	41.0	113	92			N/A
2000				822	590	41.0	113	92			
2010				819	549	41.0	112	92			
2020				816	523	41.0	112	92			
2030				813	482	41.0	112	92	25.5	.5	
Difference:	+22.48	+1.8	+24.28								
Market Emphasis Alternative	373.66	161.18	534.84								
1990				830	606	41.0	113	92			-49
2000				806	570	41.0	112	92			
2010				780	531	41.0	112	92			
2020				753	500	41.0	111	92			
2030				725	450	41.0	111	92	52.1	1.5	
Difference:	-137.56	+5.57	-131.99								

Benchmark/ Alternative	PNV	PVC	PVB	VQO Retention M Acres	VQO Partial Retention M Acres	Wildlife Management Emphasis M Acres	Declining Watershed Condition M Acres	Percent of Forest With Moderate or Low Mineral Restrictions	No. Of Deer In 2030 M Deer	No. Of Elk In 2030 M Elk	Jobs Increase or Decrease
RPA 1980 Alternative	236.10	166.75	402.85								-274
1990				849	623	134.2	112	94			
2000				844	603	134.2	111	94			
2010				838	581	134.2	110	94			
2020				834	562	134.2	110	94			
2030				828	542	134.2	110	94	54.8	2.2	

Assumes 4% Discount Rate
PNV - Present Net Value
PNC - Present Value Costs
PNB - Present Value Benefits

Difference: The PNV, PVC, PVB plus or minus difference between one alternative and the next one.

N/A - Not available.

Jobs Increase or Decrease - Change from 1985 Base explained in Chapter II B of this appendix.

TABLE BVII-3
DECREASING PRESENT NET VALUE AND PRICED OUTPUTS
(MM 1978 Dollars Inflated to 1/1/82)*

Benchmark/ Alternative	PNV	PVC	PVB	------------PRESENT VALUE BENEFITS BY RESOURCE--------------							------PRESENT VALUE COSTS BY MAJOR COST CATEGORY-----					
				REC.	RGE.	TBR.**	WL.	WTR.	MIN.	OTHER	TBR.	REC.	WL.	RGE.	PROTEC.	OTHER
Max PNV Asgn-BM	458.81	96.37	555.18	326.49	18.74	11.95	130.82	2.27	64.45	.46	9.16	16.22	4.81	5.09	14.91	46.18
Difference	-39.71	+60.06	+20.35													
Composite Alt.	419.10	156.43	575.53	326.90	20.19	23.12	132.30	8.11	64.45	.46	42.91	23.69	7.58	12.37	7.60	62.28
Difference	-2.36	-14.21	-16.57													
Non-Market Alt.	416.74	142.22	558.96	318.48	15.79	22.60	130.81	6.33	64.49	.46	28.05	44.70	5.67	6.07	7.61	50.12
Difference	-14.40	-15.22	-29.62													
Current Program Alt.	402.34	127.00	529.34	290.47	20.19	23.12	122.59	8.11	64.40	.46	42.91	15.36	2.81	8.31	6.43	51.18
Difference	-7.99	-37.15	-45.14													
Maximum Range BM	394.35	89.85	484.20	302.95	14.70	25.79	71.01	4.78	64.51	.46	19.70	10.96	1.51	15.28	14.58	27.82
Difference	-10.80	-13.49	-24.29													
Max PVN Market BM	383.55	76.36	459.91	294.50	18.74	11.95	92.97	2.27	39.02	.46	9.16	30.30	1.77	5.09	12.08	17.96
Difference	-3.98	+44.70	+40.72													
Current Budget Alt.	379.57	121.06	500.63	260.45	20.19	23.83	123.23	8.02	64.45	.46	42.18	16.03	2.61	6.53	6.53	47.18
Difference	-5.91	+40.12	+34.21													
Market Emphasis Alt.	373.66	161.18	534.84	294.50	20.53	23.41	122.82	8.61	64.51	.46	43.22	28.72	3.17	12.07	16.72	57.28
Difference	-22.48	-1.8	-24.28													
Maximum Timber BM	351.18	159.38	510.56	270.24	20.53	24.21	122.82	7.79	64.51	.46	41.72	30.19	3.17	12.07	14.92	57.31
Difference	-8.32	-65.14	-73.46													
Constrained Budget Alt.	342.86	94.24	437.10	216.07	18.74	20.77	115.43	6.69	58.94	.46	31.00	10.87	1.18	5.09	7.60	38.50
Difference	-17.98	+50.63	+32.65													
High Prod. Alt.	324.88	144.87	469.75	240.11	22.62	23.10	120.06	8.26	55.14	.46	38.54	11.55	3.88	15.28	10.37	65.25
Difference	-88.78	+21.88	-66.90													
RPA 80 Alt.	236.10	166.75	402.85	166.16	21.10	23.79	126.60	9.02	55.72	.46	50.38	26.75	3.55	11.01	15.10	59.96
Difference	-5.80	-150.43	-156.23													
Minimum Level Alt.	230.30	16.32	246.62	114.17	0	0	92.97	0	39.02	.46	0	3.37	0	0	4.14	8.81

4% discount rate used

The PNV, PVB or PVC plus or minus the differene between one alternative and the next one.

*Direct comparisons of benefits and costs displayed for individual resource outputs provide general indications of relationships but may be misleading because some outputs in multiple use forestry have common costs of production that cannot easily be separated and attributed to individual resources.

** Includes non-Forest Service costs (purchaser road construction)

VIII. TRADE-OFF ANALYSIS

Tradeoff analysis is required for National Forest Planning. Tradeoffs between outputs can be computed with the same linear programming model that the Forest used to prepare land management alternatives. By systematically varying the objective for one of the outputs of an alternative, the resulting trade-off with the output measured by the objective function of the linear program is determined. Tradeoffs cannot be reliably computed from the differences between land management alternatives. Tradeoffs may be overstated when inputs such as land are manipulated instead of outputs. A similar overstatement of tradeoffs may occur when a sufficiently wide range of management regimes is not provided to the model. Since a tradeoff analysis is only as good as the fundamental production relationships on which it is based, misleading tradeoffs can result for alternatives producing a mix of outputs outside the range of historical experience and supporting data. 1/

This discussion identifies the economic consequences of implementing the different alternatives by comparing each benchmark and alternative to the Minimum Level Benchmark (Table BVIII-1), and the Maximum PNV (Assigned) Benchmark (table BVIII-2).

Management objectives of benchmarks and alternatives were achieved by constraints both inside and outside of the FORPLAN model. The efficiency tradeoffs of individual alternatives can be determined by comparing the PNV of a mix of activities and outputs, which meets the alternative and one which does not. The change in PNV is the efficiency tradeoff of achieving a specific objective if both mixes of outputs and activities have efficient prescriptions, both mixes of outputs and activities maximize PNV, and the constraints are cost efficient. The efficiency tradeoff was not determined for individual alternative objectives because of the prohibitive costs of analyzing every constraint or objective used to develop alternatives. By comparing whole alternatives, the economic tradeoffs of the groups of objectives which have the most significant impact on PNV can be determined. These efficiency tradeoffs can then be compared to environmental and social consequences to help identify the alternative which maximizes net public benefits.

The discussion in this section focuses on economic tradeoffs. Resource outputs, socioeconomic effects, and environmental effects are discussed in chapters II and IV of the draft environmental impact statement.

Alternatives were designed to address the major issues. A single alternative cannot fully resolve all issues because of the conflicts among issues. A detailed discussion of issues is in Appendix A.

One measure of the cost of an alternative is the discounted cost which represents the equivalent payment required by the government to implement an alternative. Table BVIII-1 displays the discounted costs, discounted benefits, and PNV in order of increasing costs for benchmarks and alternatives.

1/ From: Kent P. Connaughton and Roger D. Fight, applying tradeoff analysis to National Forest Planning, Journal of Forestry, November, 1984, pp. 680-683

By comparing the benefits and costs of an alternative with the next more costly alternative, the economic consequences of the additional expenditure can be compared to the additional benefit values.

Another measure of comparison is the change in PNV between alternatives. The maximum net value of the forest is defined by the Maximum PNV - Assigned Values Benchmark at 458.81 million. The difference between 458.81 million and the PNV of an alternative represents the foregone investment opportunity to the government for implementing that alternative. Table BVIII-2 displays the discounted costs and benefits by alternative and the PNV in order of decreasing PNV. By comparing each alternative with the alternative having the next lowest PNV, the incremental economic tradeoffs can be compared.

The potential to increase economic efficiency is traded off in varying amounts in all alternatives for higher levels of road maintenance, fire protection, general administration, visual quality, and dispersed recreation quality. These costs reflect the risk of resource damage and loss of investment, the benefits of which are difficult to quantify.

Table BVIII-3 displays discounted benefits receipts and costs for the Minimum Level, Max PNV assigned values Benchmarks and all alternatives (4% discount rate used).

Table BVIII-4 displays discounted benefits, receipts and costs for the Minimum Level, Max PNV Assigned Values Benchmarks and all alternatives (7 1/8% discount rate used).

Table BVIII-5 displays present net value and priced outputs by resource category for all benchmarks (4% discount rate used).

Table BVIII-6 displays present net value and priced outputs by resource category for all alternatives (4% discount rate used).

COMPARISON OF ECONOMIC EFFECTS BY BENCHMARK AND ALTERNATIVE TO THE MAXIMUM PRESENT NET VALUE-ASSIGNED VALUES BENCHMARK

BENCHMARKS

CURRENT PROGRAM BENCHMARK

The present net cost of this alternative rose $30.63 million and the present net value of the benefits fell by $25.84 million. Recreation and Wildlife benefits fell reflecting the projected current program for these resources while Timber and Range benefits increased reflecting higher output levels.

Timber costs increased substantially and Range costs increased to a lesser degree. These cost increases were not offset by decreases in Recreation and Wildlife cost.

MAXIMUM RANGE BENCHMARK

The present net cost of this benchmark declined by $6.52 million while the present value of the benefits fell by $70.98 million. Costs increases are attributed to increases in Range related activities and Timber activities associated with an increase in transitory range. Reduced benefits occurred primarily because of decreased Wildlife benefits and some reduction in Recreation benefit values. Decreased costs for Wildlife and Recreation programs offset increases in the Timber and Range Programs.

MAXIMUM PNV-MARKET VALUES BENCHMARK

The present net costs of this benchmark fell $20.01 million while present value of benefits fell $95.27 million. Increased costs for Developed Recreation facilities were offset by larger decreases in Wildlife, Protection, and other expenditures such as general administration. Decreased levels of non-market commodities; Wildlife, and Dispersed Recreation, account for reduced benefit levels.

MAXIMUM TIMBER BENCHMARK

The present net costs of this benchmark increased $63.01 million over the planning horizon while the present value of the benefits fell by $44.62 million. Major cost increases occurred in Timber due to increased harvest on lands requiring higher production cost, however, costs also increased for Developed Recreation and Range which were held at or above current output levels. Increased Range, Developed Recreation, Timber, Range and Water Yield benefits were offset by decreased Wildlife and Dispersed Recreation benefits whose costs also declined.

MINIMUM LEVEL BENCHMARK

The present net costs of this benchmark decreased $80.05 million and the present value of the benefits declined $308.56 million. Costs declined in every major category for this custodial level of management. Benefit values also fell across the board with the least drastic reductions occurring for Wildlife and Mineral values. This benchmark has the lowest costs and benefits of all alternatives and benchmarks as would be expected from this level of management.

ALTERNATIVES

COMPOSITE ALTERNATIVE

The present net costs of this alternative rose by $60.06 million and the present value of benefits increased by $20.35 million. Increased benefits are explained by higher levels of Range, Timber, Water Yield and to a lesser degree Wildlife and Recreation outputs, while increased costs can be attributed to increased Timber and Range activities as well as to maintaining facilities at a higher level, higher expenditures for Wildlife and Recreation and the mitigation of damage to resources with no benefit values such as Scenery and Water quality. This alternative has the second highest PNV of all benchmarks and alternatives with the exception of the Max PNV Assigned Values Benchmark.

NON-MARKET EMPHASIS ALTERNATIVE

The present net cost of this alternative rose by $45.85 million and the present value of benefits rose by $3.78 million. Timber and Water benefits increased slightly and Recreation benefits fell a small amount due to a lower level of Developed Recreation. Timber costs increased to reflect increased output levels. Increases in costs for Wildlife, Recreation, Protection and other costs tend to reflect increased quality of services rendered and output levels. This alternative had the third highest PNV of all alternatives and benchmarks.

CURRENT PROGRAM ALTERNATIVE

The present net cost of this alternative rose $30.63 million and the present net value of the benefits fell by $25.84 million. Recreation and Wildlife benefits fell reflecting the projected current program for these resources while Timber and Range benefits increased reflecting higher output levels.

Timber costs increased substantially and Range costs increased to a lesser degree. These cost increases were not offset by decreases in Recreation and Wildlife costs.

CURRENT BUDGET ALTERNATIVE

The present net costs of this alternative rose $24.69 million over the 5 year planning horizon while the present value of benefits fell $54.55 million. Explanations of cost and benefit changes are similar to the Current Program Alternative with program emphases similar to that alternative but current budget levels a constraining factor.

MARKET EMPHASIS ALTERNATIVE

The present net costs of this alternative increased $64.81 million while the present value of benefits decreased by $20.34 million. Increased benefits and outputs for goods and services sold in the marketplace (Timber and associated increases in Water Yield, Range, Developed Recreation and minerals) were offset by decreases in benefits and outputs for goods and services with RPA assigned values (Wildlife and Dispersed Recreation). Cost increases paralleled output increases of Market Commodities with high timber costs associated with increased harvest on lands with higher production costs.

This alternative had the second highest cost of all alternatives and benchmarks but similar to costs associated with the maximum Timber Benchmark.

CONSTRAINED BUDGET ALTERNATIVE

The present net costs of this alternative fell $2.13 million and present value of benefits fell $118.08 million over the 50 year planning period. Explanations of cost and benefit changes are similar to the Current Program Alternative with program emphases similar to that alternative, but with a budget constrained below the current budget level a further limiting factor. An exception is the Range resource with costs and benefits identical to the Max PNV Assigned Values Benchmark.

HIGH PRODUCTIVITY ALTERNATIVE

The present net costs of this alternative rose $48.5 million and present value of benefits fell $85.43 million. Explanations of cost and benefit changes parallel the Market Alternative with a further decrease in Wildlife and Recreation outputs and costs.

RPA 80 ALTERNATIVE

The present net cost of this alternative were the highest of all the alternatives and benchmarks reflecting an increase of $70.38 million. Benefit values fell $152.33 million lowest of all alternatives and benchmarks with the exception of the Minimum Level Benchmark. Recreation benefits made up most of the benefit decrease. Costs increased substantially for timber, primarily because of timing of investment costs early in the planning period and increased harvest activity on lands with high production costs. The same is true for the Range resource. Recreation costs also increased substantially. Increased Timber and Range benefits due to higher output levels were surpassed by overall cost increases and benefit declines in other resources.

TABLE-BVIII-1
DISCOUNTED COSTS, BENEFITS, AND PRESENT NET VALUE RANKED ACCORDING TO INCREASING COST
(4% Discount Rate, Millions of 1982 Dollars)

BENCHMARKS	PVC	Change in PVC	PVB	Change in PVB	PNV	Change in PNV
Minimum Level	16.32		246.62		230.30	
Max PNV Market	76.36	+60.04	459.91	+213.29	383.55	+153.25
Maximum Range	89.85	+73.53	484.20	+237.58	394.35	+164.05
Max PNV Assigned	96.37	+80.05	555.18	+308.56	458.81	+228.51
Current Program	127.00	+110.68	529.34	+282.72	402.34	+172.04
Maximum Timber	159.38	+143.06	510.56	+263.94	351.18	+120.88
ALTERNATIVES						
Constrained Budget	94.24	+77.92	437.10	+190.48	342.86	+112.56
Current Budget	121.06	+104.74	500.63	+254.01	379.57	+149.27
Current Program	127.00	+110.68	529.34	+282.72	402.34	+172.04
Non-Market	142.22	+125.90	558.96	+312.34	416.74	+186.44
High Productivity	144.87	+128.55	469.75	+223.13	324.88	+94.58
Composite	156.43	+140.11	575.53	+328.91	419.10	+188.80
Market	161.18	+144.86	534.84	+288.22	373.66	+143.36
RPA 80	166.75	+150.43	402.85	+156.23	236.10	+5.80

TABLE BVIII-2
DISCOUNTED COSTS, BENEFITS, AND PRESENT NET VALUE RANKED ACCORDING TO DECREASING PRESENT NET VALUE
(4% Discount Rate, Millions of 1982 Dollars)

BENCHMARKS	PVC	Change in PVC	PVB	Change in PVB	PNV	Change in PNV
MAX PNV Assigned	96.37		555.18		458.81	
Current Program	127.00	+30.63	529.34	-25.84	402.34	-56.47
Maximum Range	89.85	-6.52	484.20	-70.98	394.35	-64.46
Max PNV Market	76.36	-20.01	459.91	-95.27	383.55	-75.26
Maximum Timber	159.38	+63.01	510.56	-44.62	351.18	-107.63
Minimum Level	16.32	-80.05	246.62	+308.56	230.30	-228.51
ALTERNATIVES						
Composite	156.43	+60.06	575.53	+20.35	419.10	-39.71
Non-Market	142.22	+45.85	558.96	+3.78	416.74	-42.07
Current Program	127.00	+30.63	529.34	-25.84	402.34	-56.47
Current Budget	121.06	+24.69	500.63	-54.55	379.57	-79.24
Market	161.18	+64.81	534.84	-20.34	373.66	-85.15
Constrained Budget	94.24	-2.13	437.10	-118.08	342.86	-115.95
High Productivity	144.87	+48.15	469.75	-85.43	324.88	-133.93
RPA 80	166.75	+70.38	402.85	-152.33	236.10	-222.71

TABLE BVIII-3
DISCOUNTED BENEFITS, RECEIPTS AND COSTS, 4% DISCOUNT RATE MM$
(1978 Dollars Inflated to 01/01/82)

	--------BENCHMARKS---			-----------------------------ALTERNATIVES-----------------------------						
	MIN. LEVEL	MAX. PNV ASSIGN.	CURRENT PROGRAM/A	B	C	D	E	F	G	H
Present Net Value, PNV (Benefits)	230.30	458.81	402.34	419.10	342.86	379.57	416.74	373.66	236.10	324.88
Present Net Value, PNV (Receipts)	-15.47	-74.21	-94.84	-123.18	-68.06	-90.13	-112.15	-126.79	-134.98	-112.35
Present Value of Benefits, PVB	246.62	555.18	529.34	575.53	437.10	500.63	558.96	534.84	402.85	469.75
Present Value of Receipts, PVR	.85	22.16	32.16	33.25	26.18	30.93	30.07	34.39	31.77	32.52
Present Value of Costs, PVC	16.32	96.37	127.00	156.43	94.24	121.06	142.22	161.18	166.75	144.87
PVB by Output										
Recreation	114.17	326.49	290.47	326.90	216.07	260.45	318.48	294.50	166.16	240.11
Range	0	18.74	20.19	20.19	18.74	20.19	15.79	20.53	21.10	22.62
Timber	0	11.95	23.12	23.12	20.77	23.83	22.60	23.41	23.79	23.10
Wildlife (WFUD's)	92.97	130.82	122.59	132.30	115.43	123.23	130.81	122.82	126.60	120.06
Water Yield	0	2.27	8.11	8.11	6.69	8.02	6.33	8.61	9.02	8.26
Minerals	39.02	64.45	64.40	64.45	58.94	64.45	64.49	64.51	55.72	55.14
Other	.46	.46	.46	.46	.46	.46	.46	.46	.46	.46
PVR by Output										
Recreation	.28	7.39	6.08	7.16	2.64	4.10	5.03	7.92	4.87	6.11
Range	0	2.34	2.52	2.52	2.34	2.52	1.99	2.57	2.64	2.83
Timber	0	11.72	22.82	22.82	20.49	23.56	22.32	23.13	23.51	22.83
Wildlife (WFUD's)	0	0	0	0	0	0	0	0	0	0
Water Yield	0	0	0	0	0	0	0	0	0	0
Minerals	.11	.25	.28	.29	.25	.29	.27	.31	.29	.29
Other	.46	.46	.46	.46	.46	.46	.46	.46	.46	.46
PVC, by Program Component										
Timber	0	9.16	42.91	42.91	31.00	42.18	28.05	43.22	50.38	38.54
Recreation	3.37	16.22	15.36	23.69	10.87	16.03	44.70	28.72	26.75	11.55
Wildlife	0	4.81	2.81	7.58	1.18	2.61	5.67	3.17	3.55	3.88
Range	0	5.09	8.31	12.37	5.09	6.53	6.07	12.07	11.01	15.28
Protection	4.14	14.91	6.43	7.60	7.60	6.53	7.61	16.72	15.10	10.37
Other	8.81	46.18	51.18	62.28	38.50	47.18	50.12	57.28	59.96	65.25
Total Forest Budget	16.32	95.48	123.29	152.72	91.37	117.58	139.75	157.50	162.63	140.96
O&M	16.32	82.11	85.46	105.71	64.09	78.51	101.97	108.88	105.66	100.79
Investment	0	13.37	37.83	47.01	27.28	39.07	37.78	48.62	56.97	40.17
Non-Forest Service Costs	0	.89	3.71	3.71	2.87	3.48	2.47	3.68	4.12	3.91
Returns in Treasury	.85	22.16	32.16	33.25	26.18	30.93	30.07	34.39	31.77	32.52

TABLE BVIII-4
DISCOUNTED BENEFITS RECEIPTS AND COSTS, 7 1/8% DISCOUNT RATE MM$
(1978 Dollars Inflated to 01/01/82)

	---BENCHMARKS---			---ALTERNATIVES---						
	MIN. LEVEL	MAX. PNV ASSIGN.	CURRENT PROGRAM/A	B	C	D	E	F	G	H
Present Net Value, PNV (Benefits)	145.31	263.28	229.85	234.53	210.34	225.82	243.71	218.35	209.29	190.75
Present Net Value, PNV (Receipts)	-9.63	-47.22	-61.36	-80.02	-42.08	-56.25	-70.98	-75.45	-85.12	-69.06
Present Value of Benefits, PVB	155.48	322.77	312.08	335.78	269.92	302.96	334.12	316.03	316.32	281.75
Present Value of Receipts, PVR	.54	12.27	20.87	21.23	17.50	20.89	19.43	22.23	21.91	21.94
Present Value of Costs, PVC	10.17	59.49	82.23	101.25	59.58	77.14	90.41	97.68	107.03	91.00
PVB by Output										
Recreation	69.40	179.62	160.48	179.94	127.72	149.40	182.32	162.75	96.76	133.98
Range	0	11.99	12.78	12.78	11.99	12.78	10.00	13.01	13.31	14.12
Timber	0	6.63	15.58	15.58	14.13	16.48	15.03	16.31	17.19	16.60
Wildlife (WFUD's)	61.32	81.83	77.34	82.56	74.39	78.36	81.82	77.86	79.70	76.93
Water Yield	0	1.59	4.87	4.87	4.13	4.83	3.84	5.22	5.50	4.96
Minerals	24.47	40.82	40.74	39.76	37.27	40.82	40.82	40.88	35.37	34.87
Other	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29
PVR by Output										
Recreation	.18	3.85	3.40	3.77	1.60	2.54	2.89	3.99	2.77	3.28
Range	0	1.50	1.59	1.59	1.50	1.59	1.24	1.63	1.67	1.76
Timber	0	6.48	15.40	15.40	13.96	16.29	14.84	16.12	17.00	16.43
Wildlife (WFUD's)	0	0	0	0	0	0	0	0	0	0
Water Yield	0	0	0	0	0	0	0	0	0	0
Minerals	.07	.15	.19	.18	.15	.18	.17	.20	.18	.18
Other	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29
PVC, by Program Component										
Timber	0	5.21	29.37	29.37	19.51	26.90	17.61	26.87	32.89	24.77
Recreation	2.08	10.35	9.54	14.63	6.77	10.22	28.79	15.30	15.60	7.07
Wildlife	0	2.93	1.74	4.88	.74	1.68	3.44	2.00	2.23	2.42
Range	0	3.25	5.25	7.65	3.25	4.20	3.88	7.55	6.80	9.78
Protection	2.62	9.45	3.88	4.89	4.83	3.93	4.84	10.61	9.59	7.20
Other	5.47	28.30	32.45	39.83	24.48	30.21	31.85	35.35	39.92	39.76
Total Forest Budget	10.17	58.03	79.71	98.73	57.79	74.95	88.87	95.37	104.26	88.31
O&M	10.17	51.03	54.07	67.21	40.78	49.89	65.33	67.34	65.39	63.16
Investment	0	7.00	25.64	31.52	17.01	25.06	23.54	28.03	38.87	25.15
Non-Forest Service Costs	0	.46	2.52	2.52	1.79	2.19	1.54	2.31	2.77	2.69
Returns in Treasury	.54	12.27	20.87	21.23	17.50	20.89	19.43	22.23	21.91	21.94

TABLE BVIII-5
PRESENT NET VALUE AND PRICED OUTPUTS
(Thousands of 1978 Dollars Inflated to 1/1/82)*

BENCH-MARKS	PNV	PV COSTS**	PV BENEFITS	PV BENEFITS BY RESOURCE REC.	RGE.	TBR.	WL.	WTR.	MIN.	OTHER	PVC COSTS BY MAJOR COST CATEGORIES TBR***	REC.	WL.	RGE.	PROTEC.	OTHER
Minimum Level	230300	16320	246620	114170	0	0	92970	0	39020	460	0	3370	0	0	4140	8810
Maximum Range	394350	89850	484200	302950	14700	25790	71010	4780	64510	460	19700	10960	1510	15280	14580	27820
Maximum Timber	351180	159380	510560	270240	20530	24210	122820	7790	64510	460	41720	30190	3170	12070	14920	57310
Max PNV Market	383550	76360	459910	294500	18740	11950	92970	2270	39020	460	9160	30300	1770	5090	12080	17960
Max PNV Assigned	458810	96370	555180	326490	18740	11950	130820	2270	64450	460	9160	16220	4810	5090	14910	46180
Current Program	402340	127000	529340	290470	20190	23120	122590	8110	64400	460	42910	15360	2810	8310	6430	51180

* Direct comparisons of benefits and costs displayed for individual resource outputs provide general indications of relationships but may be misleading because some outputs in multiple use forestry have common costs of production that cannot be easily separated and attributed to individual resources.

** 4% Discount Rate used.

*** Includes non-Forest Service Costs (Purchaser Road Construction).

NOTE: Support costs to these program components (Tbr, Rec, Wl, Rge, Other, etc.) from other program components are included.

TABLE BVIII-6
PRESENT NET VALUE AND PRICED OUTPUTS
(Thousands of 1978 Dollars Inflated to 1/1/82)*

BENCH-	(RECEIPTS)	PV	PV	PV RECEIPTS BY RESOURCE						PVC COSTS BY MAJOR COST CATEGORIES					
MARKS	PNV	COSTS**	RECEIPTS	REC.	RGE.	TBR.	WL.	WTR.	MIN.	OTHER	TBR***	REC.	WL.	RGE.	PROTEC.	OTHER
Minimum Level	-15470	16320	850	280	0	0	0	0	110	460	0	3370	0	0	4140	8810
Maximum Range	-56110	89850	33740	4690	2770	25510	0	0	310	460	19700	10960	1510	15280	14580	27820
Maximum Timber	-126500	159380	32880	5490	2570	24050	0	0	310	460	41720	30190	3170	12070	14920	57310
Max PNV Market	-53810	76360	22550	7920	2340	11720	0	0	110	460	9160	30300	1770	5090	12080	17960
Max PNV Assigned	-74210	96370	22160	7390	2340	11720	0	0	250	460	9160	16220	4810	5090	14910	46180
Current Program	-94840	127000	32160	6080	2520	22820	0	0	280	460	42910	15360	2810	8310	6430	51180

* Direct comparisons of receipts and costs displayed for individual resource outputs provide general indications of relationships but may be misleading because some outputs in multiple use forestry have common costs of production that cannot be easily separated and attributed to individual resources.

** 4% Discount Rate used.

*** Includes non-Forest Service Costs (Purchaser Road Construction).

NOTE: Support costs to these program components (Tbr, Rec, Wl, Rge, Other, etc.) from other program components are included.

APPENDIX C
REGIONAL GLOSSARY

A

Access - See Public access.

Acquired land - National Forest land purchased, donated, or received in exchange for purchased or donated lands. Acquired National Forest land has Weeks Act status under the Act of September 2, 1958 (72 Stat. 1571).

Acre equivalent - The index of acres affected by wildlife habitat improvements in contrast to actual acres treated.

Acre-foot - A measure of water or sediment volume equal to the amount which would cover an area of 1 acre to a depth of 1 foot (325,851 gallons).

Activity - The work processes or management practices that are conducted to produce, enhance, or maintain outputs or achieve administrative and environmental quality objectives (FSM 1309, Management Information Handbook). An activity can generate multiple outputs.

Activity fuels - Debris generated from any activity on the Forest such as firewood gathering, precommercial thinning, timber harvesting, and road construction, which increases fire potential.

Activity outputs - The quantifiable goods or services resulting from any management actions taken on the Forest.

Administrative headquarters site - A site which exists primarily for general administrative purposes. It normally will include office, warehouse, outside storage, and parking areas. It may include housing and pasture for livestock. A work center may be part of an administrative headquarters site.

Administrative unit - All the National Forest System lands for which one Forest Supervisor has responsibility.

Aerial logging - Log yarding methods employed in very steep or remote areas using helicopters, balloons or other aerial log suspension equipment.

Affected environment - The natural and physical environment under the administration of one line officer, such as District Ranger or Forest Supervisor.

Age class - An interval, usually 10 to 20 years, into which the age ranges of vegetation are divided for classification or use.

Agricultural base - Economy in which the base industry of a community is agriculture.

Airshed - A geographic area that, because of topography, meteorology, and climate, shares the same air. As applied to the National Forest by the Clean Air Act, amended August 1977, the term covers all wilderness areas larger than 5,000 acres that were in existence as of August 1977.

Alignment - The specific surveyed location or route.

Allotment - See Range allotment.

Allowable sale quantity - The quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for a time period specified by the Plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity."

Alternative - One of several policies, plans, or projects proposed for decision-making.

Anadromous fish - Those species of fish that mature in the sea and migrate into streams to spawn; i.e., salmon, steelhead.

Analysis area - One or more capability areas grouped for purposes of analysis. They are similar land areas of various sizes based on common biological impacts, effects, and social or economic factors.

Analysis of the Management Situation (AMS) - A determination of the ability of the planning area to supply goods and services in response to society's demand for those goods and services.

Animal Unit Month (AUM) - The amount of forage required by an animal unit (considered to be 1,000 lbs. for a cow) for 1 month.

Annual Forest program - The summary or aggregation of all projects that make up an integrated (multifunctional) course of action, at a given level of funding for a Forest planning area, that is consistent with the Forest Plan.

Annual work planning process - The process used to translate the objectives from the Regional Guide into specific activities to be carried out during one fiscal year.

Appropriate costs - The sum of operational and capital investment costs, including overhead.

Aquatic ecosystems - The physical environment of or pertaining to water--stream channel, lake or pond bed, wetland, water itself--and biotic communities that occur therein.

Arterial roads - Roads comprising the basic access network for National Forest System administrative and management activities. These roads serve all resource elements to a substantial extent, and maintenance is not normally determined by the activities of any one element. They provide service to large land areas and usually connect with public highways or areas or other Forest arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than by a specific resource management service. Usually, they are developed and operated for long-term land and resource management purposes and constant service.

Assessment - The Forest and Rangeland Renewable Resource Assessment required by the Resources Planning Act (RPA).

Available, capable, and suitable - See "Available forest lands," "Capable lands" and "Suitable lands."

Available forest land - Land which has not been legislatively withdrawn or administratively withdrawn by the Secretary of Agriculture or Forest Service Chief from timber production.

Average annual cut - The volume of timber harvested in a decade, divided by 10; used as a basis for comparison of alternatives, not as a measure of nondeclining yield.

Avoidance areas - Areas having one or more physical, environmental, institutional, or statutory impediments to corridor designation.

There are two types of avoidance areas:

1. Discretionary--areas that may be crossed by corridors only if necessary and reasonable mitigation or avoidance of significant impacts can be obtained.

2. Nondiscretionary--areas that may not be crossed by corridors unless authorized by the appropriate official (for example, Governor, President).

B

Background - The visible terrain beyond the foreground and middleground where individual trees are not visible but are blended into the total fabric of the stand. (See "Foreground" and "Middleground."

Basal area - The area of the cross-section of a tree stem near the base, generally at breast height and inclusive of bark.

Base area - The public or private land used to support a recreation operation that depends on use of National Forest System land for its viability. Usually used to describe the base facility of a ski area.

Base property (commensurate property) - Those lands in a ranching enterprise which are owned by the operator and are considered as the basis for a term grazing permit.

Base sale schedule - A timber sale schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade, and this planned sale and harvest for any decade is not greater than the long-term sustained yield capacity. (This definition expresses the principle of nondeclining flow.)

Baseline - With respect to soils, the amount of erosion and sedimentation due to natural sources in the absence of human activity.

Benchmark - Reference points that define the bounds within which feasible management alternatives can be developed. Benchmarks may be defined by resource output or economic measures.

Benefit - The total value of an output or other effect.

Benefit cost/ratio - Measure of economic efficiency computed by dividing total discounted primary benefits by total discounted economic costs.

Best Management Practices (BMP) - A practice or combination of practices that are the most effective and practical (including technological, economic, and institutional considerations level compatible with water quality goals.

Big game - Those species of large mammals normally managed as a sport hunting resource.

Big game winter range - The area available to and used by big game through the winter season.

Biological capacity - The average net growth of wood attainable under intensive management.

Biological control - A method to control pest populations through the use of antagonistic organisms.

Biological growth-potential - The average net growth attainable in a fully stocked natural forest stand.

Biological potential - The maximum possible output of a given resource, limited only by its inherent physical and biological characteristics.

Board feet - The amount of wood equivalent to a piece of wood one foot by one foot by one inch thick. Generally, five board feet log measure is approximately equivalent to one cubic foot of round wood.

Board foot/cubic foot conversion ratio - Both board foot and cubic foot volumes can be determined for timber stands. The number of board feet per cubic foot of volume varies with tree species, diameter, height, and form factors. This factor is applied to the cubic foot FORPLAN outputs to give board foot estimates.

Broadcast burn - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard or as a silvicultural treatment, or both.

British Thermal Unit (BTU) - The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.

Browse - Twigs, leaves, and young shoots of trees and shrubs on which animals feed; in particular, those shrubs which are utilized by big game animals for food.

C

Cable logging - A log yarding method employed on steep slopes using a system of steel cables and winches.

Canopy - The more-or-less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth.

Capable lands - Those portions of the Forest that have an inherent ability to support trees for timber harvest and produce at least 20 cubic feet/acre/year of wood fiber.

Capability - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease.

Capital investment costs - Those associated with construction or development of improvements; includes road construction, reforestation, campground construction, range improvements, etc.

Carrying capacity - The number of organisms of a given species and quality that can survive in, without causing deterioration of, a given ecosystem through the least favorable environmental conditions that occur within a stated interval of time.

Catastrophic condition - A significant change in forest conditions on the area that affects Forest Plan resource management objectives and their projected and scheduled outputs, uses, costs, and effects on local communities and environmental quality.

Cavity - The hollow excavated in trees by birds or other natural phenomena; used for roosting and reproduction by many birds and mammals.

CEQ - See "Council on Environmental Quality."

CFR - Code of Federal Regulations.

Chemical control - A method to control insect populations, noxious weeds, undesirable vegetation, tree diseases, or other pests through the use of applied chemicals.

Clearcutting - The cutting method that describes the silviculture system in which the old crop is totally harvested over a considerable area at one time. Regeneration then occurs from (a) natural seeding from adjacent stands, (b) seed contained in the slash or logging debris, (c) advance growth, or (d) planting or direct seeding. An even-aged forest usually results.

Climax - The highest ecological development of a plant community capable of perpetuation under the prevailing climatic and edaphic conditions.

Closure - The administrative order restricting either location, timing, or type of use in a specific area.

Coliform bacteria - Any of several bacteria found in the large intestine of man and animals, the presence of which indicates fecal pollution.

Collector roads - Roads constructed to serve two or more elements but which do not fit into the other two categories (arterial or local). Construction costs of these facilities are prorated to the respective element served. These roads serve smaller land areas and are usually connected to a Forest arterial or public highway. They collect traffic from Forest roads or terminal facilities. The location and standard are influenced by both long-term multi-resource service needs and travel efficiency. Forest collector roads are operated for constant service.

Commercial Forest Land (CFL) - See "Timber classification."

Commodities - Products produced from a parcel of land; e.g., outputs of wood, livestock forage, and minerals.

Community lifestyles - The ways in which residents conduct their everyday routines and how the "way they live" is associated with the National Forest.

Community stability - The capacity of a community to absorb and cope with change without major hardship to institutions or groups within the community.

Concern - See "Management concern."

Confinement - To restrict fire within determined boundaries established either prior to the fire, during the fire, or in an escaped fire situation analysis. The normal tactic is surveillance only.

Congressionally classified and designated areas - Areas which require Congressional enactment for their establishment, such as National Wilderness, National Wild and Scenic Rivers, and National Recreation Areas.

Conifer - Those cone-bearing trees, mostly evergreen, including the pine, spruce, fir, etc.

Consumptive use - A use of resources that reduces the supply, such as logging and mining. See also "Nonconsumptive use."

Containment - To surround a fire, and any spot fires therefrom, with control line, as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions. The normal tactic is indirect attack and burn to human-made or natural barrier with little or no mop-up.

Control - To complete the control line around a fire, any spot fires therefrom, and any interior islands to be saved, burn out any unburned area adjacent to the fire side of the control line, and cool down all hot spots that are immediate threats to the control line, until the line can reasonably be expected to hold under foreseeable conditions. The normal tactic is direct attack on the fire, if possible, and mop-up.

Corridor - A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries.

Cost effectiveness - Achieving specified outputs or objectives under given conditions for the least cost.

Cost-efficiency - The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values but are achieved at specified levels in the least cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates-of-return may be appropriate.

Council on Environmental Quality - An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Cover/forage ratio - The ratio of cover (usually conifer types) to foraging areas (natural openings, clearcuts, etc.)

Created opening - See "Tree opening."

Critical habitat - Areas designated by Secretary of the Interior or Commerce for the survival and recovery of federally listed threatened or endangered species.

Crown height - Of a standing tree, the vertical distance from ground level to the base of the crown measured either to the lowest live branchwhorl or to the lowest live branch (excluding shoots arising spontaneously from buds on the stem of a woody plant) or to a point halfway between.

Cubic foot - The amount of timber equivalent to a piece of wood one foot by one foot by one foot.

Cubic yard - A measure of soil or sediment volume which would cover a square yard of area one yard deep (3 feet x 3 feet x 3 feet).

Culmination of mean annual increment - The point where the mean annual growth increment (the basal area of a stand of trees divided by their age) ceases to increase prior to decline.

Cultural resource - The remains of sites, structures, or objects used by humans in the past--historical or archaeological.

Cultural sensitivity - Refers to the likelihood of encountering significant cultural volumes (quantity and/or quality) which may affect and be affected by ground-disturbing activities.

Cutting cycle - The planned lapse of time between successive cuttings in a stand.

D

dbh - Diameter at breast height. The diameter of a tree measured 4 feet 6 inches above the ground.

Deficit timber sale - A timber sale where the costs associated with producing the primary product(s) plus profit margin are greater than the selling value of the same product(s).

Decking areas - Sites that are intermediate between stump and landing, used to collect logs.

Decision criteria - Essentially the rules or standards used to evaluate alternatives. They are measurements or indicators that are designed to assist a decisionmaker to identify a preferred choice from the array of possible alternatives.

Demand - The quantity of goods or services called for at various prices, holding other factors constant.

Departure - The temporary deviation from the non-declining even-flow policy.

Dependent communities - Communities whose social, economic, or political life would become discernibly different in important respects if market or nonmarket outputs from the National Forests were cut off.

Design capacity - The maximum theoretical amount of use a developed recreation site was built to accommodate.

Design standard - Approved design and construction specifications mainly used for recreation facilities and roads--includes specified materials, colors, dimensions, etc.

Designated corridor - A linear area of land with defined and recognized boundaries identified and designated by legal public notice.

Destination resort - A recreation resort designed for multi-day use in contrast to day use.

Determinate stand - A group of trees of similar age and species composition that are clearly a separate group from surrounding stands.

Developed recreation - Recreation that requires facilities that, in turn, result in concentrated use of an area. Examples of recreation areas are campgrounds and ski areas; facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings.

Developed recreation site - Relatively small, distinctly defined area where facilities are provided for concentrated public use on a planned basis; e.g., campgrounds, picnic areas, swimming areas.

dib - Diameter inside bark of a tree or log at a specified point.

Direct outputs - Resource outputs that are caused by the action and occur at the same time and place.

Direction - See "Management direction."

Discount rate - An interest rate that represents the cost or time value of money in determining the present value of future costs and benefits.

Discounting - An adjustment, using a discount rate, for the value of money over time so that costs and benefits occurring in the future are reduced to a common time, usually the present, for comparison.

Dispersed recreation - A general term referring to recreation use outside the developed recreation site; this includes activities such as scenic driving, hunting, backpacking, and recreation in primitive environments.

Distance zone - Areas of landscapes denoted by specified distances from the observer. Used as a frame of reference in which to discuss landscape characteristics or activities of man. The three categories are:

Foreground - The detailed landscape found within 0 to 1/4-1/2 mile from the observer.

Middleground - The space between the foreground and the background in a picture of landscape. The area located from 1/4-1/2 to 3-5 miles from the viewer.

Background - The distant part of a landscape, picture, etc.; surroundings, especially those behind something and providing harmony or contrast; surrounding area or surface. Area located from 3-5 miles to infinity from the viewer.

District - See "Ranger District."

Diversity - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan. See also "Edge," "Horizontal Diversity," and "Vertical Diversity."

Diversity unit - A specific area of land prescribed by management direction to have certain diversity characteristics.

Draft Environmental Impact Statement - The statement of environmental effects which is required for major Federal actions under Section 102 of the National Environmental Policy Act, and released to the public and other agencies for comment and review.

E

Early forest succession - The biotic community that develops immediately following the removal or destruction of the vegetation in an area.

Economic efficiency analysis - An analytical method in which incremental market and nonmarket benefits are compared with incremental economic costs.

Economic growth - Increased economic output in real terms over time.

Ecosystems - An interacting system of organisms considered together with their environment; for example, marsh, watershed, and lake ecosystems.

Edge - Where plant communities meet or where successional stages or vegetation conditions within the plant communities come together. See also "edge contrast" and "horizontal diversity."

Edge contrast - A qualitative measure of the difference in structure of two adjacent vegetative areas; for example, "low," "medium," or "high" edge contrast.

Effects - Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in this statement are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial (40 CFR 1508.8).

Electronic sites - Areas designated for the operation of equipment which transmit and receive radio signals, excluding television aerials and antennas, for local pickup of programing and passive reflectors.

Endangered species - Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plants or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

Endemic plant - A plant confined to a certain country or region and with a comparatively restricted geographic distribution.

Environmental analysis - An analysis of alternative actions and their predictable short-and long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions.

Environmental Assessment - The concise public document required by the regulations for implementing the procedural requirements of NEPA (40 CFR 1508.9).

Environmental documents - A set of concise documents to include, as applicable, the Environmental Assessment, Environmental Impact Statement, Finding of No Significant Impact, or Notice of Intent.

Environmental Impact Statement (EIS) - A statement of the environmental effects of a proposed action and alternatives to it. It is required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA) and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal.

Ephemeral streams - Streams that flow only as a direct response to rainfall or snowmelt events. They have no base flow.

Escape cover - Usually, vegetation dense enough to hide an animal; an area used by animals to escape from potential predators.

Evaluation criteria - Standards developed for appraising alternatives.

Even-aged management - The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes) throughout the forest area. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

Even-aged silviculture - The combination of timber management actions that result in the creation of stands where trees of essentially the same age grow together.

Clearcutting - The removal, in a single cut, of all trees in stands larger than seedlings.

Seed tree cutting - Similar to clearcutting, except that a few of the better trees of the desired species are left scattered over the area to provide seed for regeneration.

Shelterwood cutting - The removal of all trees in a series of two or more cuts over a period of not more than 30 years.

Even-aged systems - Product stands in which all trees are of about the same age. (A spread of 10 to 20 years is generally considered one age class). Cutting methods producing even-aged stands are clearcut, sheterwood, or seed tree systems.

Even-flow - Maintaining a relatively constant supply of timber from decade to decade.

Exclusion areas - Areas having been determined to be unavailable for corridor allocation or facility siting for reasons of unsuitability, legislative classification, or prior, unalterable allocation of uses incompatible with the proposed use.

Expanded suppression - The control or containment of wildfires at increased acreage within allowable fire intensity levels and fire control standards.

Experience levels - The range of opportunities for satisfying basic recreation needs of people. A scale of five experience levels ranging from "primitive" to "modern" is planned for the National Forest System.

Extensive grazing - Management seeks full utilization of forage allocated to livestock. Cost-effective management systems and techniques, including fencing and water development, are designed and applied to obtain relatively uniform livestock distribution and use of forage and maintain plant vigor.

F

Facilities - Improvements that are used for shelter or support of Forest Service programs. Examples include Ranger Station compounds, leased offices, housing areas, work centers, recreation complexes, and utility systems.

Facility condition class - The rating system used in the Recreation Information Management System to classify the condition of repair that a specific facility is in and maintenance needs of recreation facilities. Used for planning and budget request.

Family unit - A developed site or picnic spot that usually includes a table, fireplace, tent pad, and parking spot designed to handle a family or small group of people.

Federal Register - Published document that provides a uniform system for making available to the public regulations and legal notices issued by federal agencies.

Fee ownership - Ownership of property that has no limitation, qualification, or condition affecting it and is the maximum possible ownership in real estate under the system of property rights founded on English common law.

Fee purchase - Acquisition of fee ownership to a piece of property.

Fee site - A Forest Service recreation area in which users must pay a fee. Fee sites must meet certain standards and provide certain facilities as specified in the Forest Service Manual.

Final cut - Removal of the last seed bearers or shelter trees after regeneration is considered to be established under a shelterwood system.

Fire hazard - The fuel in which a fire will ignite and burn.

Fire management - All activities required for protection of resources from fire and the use of fire to meet land management goals and objectives.

Fire risk - The potential cause of a fire.

Firewood - See "Fuelwood."

Fisheries habitat - Streams, lakes, and reservoirs that support fish.

Flood plains - The lowland and relatively flat area adjoining inland waters, including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

Forage - All browse and nonwoody plants that are available to livestock or wildlife for grazing or harvested for feeding.

Forb - Any herbaceous plant other than true grasses, sedges, or rushes.

Forest and Rangeland Renewable Resources Planning Act of 1974 - An Act of Congress requiring the preparation of a program for the management of the National Forests' renewable resources and of land and resource management plans for units of the National Forest System. It also requires a continuing inventory of all National Forest System lands and renewable resources.

Foreground - A term used in visual management to describe the landscape within 1/2 mile of a high-value scenic area, recreation facility, or forest highway. See "Background" and "Middleground."

Forest development roads and trails - A legal term for Forest roads or trails that are under the jurisdiction of the Forest Service.

Forest land - See "Timber classification."

Forest Supervisor - The official responsible for administering the National Forest System lands in a Forest Service administrative unit, which may consist of two or more National Forests or all the Forests within a state. He reports to the Regional Forester.

Forest development transportation system - Roads that are part of the Forest development transportation system, which includes all existing and planned roads, trails, and airfields, as well as other special and terminal facilities designated as Forest development transportation facilities. (See arterial roads, collector roads, and local roads.)

Forest-wide standard - A performance criterion indicating acceptable norms, specifications, or quality that actions must meet to maintain the minimum considerations for a particular resource. This type of standard applies to all areas of the Forest regardless of the other prescriptions applied.

FORPLAN - A linear programing system used for developing and analyzing Forest planning alternatives.

FSH - Forest Service Handbook.

FSM - Forest Service Manual.

Fuel break - A zone in which fuel quantity has been reduced or altered to provide a position for suppression forces to make a stand against wildfire. Fuel breaks are designated or constructed before the outbreak of a fire. Fuel breaks may consist of one or a combination of the following: natural barriers, constructed fuel breaks, manmade barriers.

Fuel model - A simulated fuel complex for which all the fuel descriptions required by the mathematical fire spread model have been specified.

Fuel treatment - The rearrangement or disposal of natural or activity fuels to reduce the fire hazard. Fuels are defined as both living and dead vegetative materials consumable by fire.

Fuels - Include both living plants and dead, woody vegetative materials which are capable of burning.

Fuels management - The practice of planning and executing treatment or control of any vegetative material that adversely affects meeting fire management direction based upon resource management goals and objectives.

Fuelwood - Wood--round, split, or sawed, and generally otherwise refuse material--cut into short lengths for burning. Includes firewood.

Full service management (FSM) - Full service management or standard management is achieved in recreation when signing, cleanup, maintenance, and administration are accomplished according to standards and objectives established in approved management plans.

Future scenarios - A word picture of a fixed sequence of future events in a defined environment.

G

Game species - Any species of wildlife or fish for which seasons and bag limits have been prescribed and which are normally harvested by hunters, trappers, and fishermen under state or Federal laws, codes, and regulations.

Goal - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed.

Goods and services - The various outputs, including on-site uses, produced from forest and rangeland resources.

Grass/forb - An early Forest successional stage where grasses and forbs are the dominant vegetation.

Grazing allotment - See "Range allotment."

Group selection cutting - The silvicultural harvest method in which trees are removed periodically in small groups, resulting in openings that do not exceed an acre or two in size. This leads to the formation of an uneven-aged stand in the form of a mosaic of age-class groups in the same forest.

Growing season - The months of the year during which a species of vegetation grows.

Growing stock level - A measurement of timber stand density referring to the number or volume of trees growing in a forest or in a specified part of it, measured in terms of basal area per acre or trees per acre.

Guideline - An indication or outline or policy or conduct; i.e., any issuance that assists in determining the course of direction to be taken in any planned action to accomplish a specific objective.

H

Habitat - The place where a plant or animal naturally or normally lives or grows.

Habitat capability - The ability of a land area or plant community type to support a given species of wildlife.

Habitat diversity - See "Wildlife habitat diversity."

Habitat diversity index - A measure of habitat diversity improvement expressed as a percentage of optimum size class distribution that is achieved over time.

Habitat effectiveness - See "Wildlife habitat effectiveness."

Habitat grouping - Grouping of habitat types in logical categories to facilitate resource planning.

Habitat type - The aggregate of all areas that support or can support the same primary vegetation at climax.

Harvest cutting - Harvesting a stand of timber at maturity or for the purpose of regeneration.

Herbicide - A chemical compound used to kill or control growth of undesirable plant species.

Hiding area - Includes vegetation capable of hiding 90 percent of an adult elk or deer from a human's view at a distance equal to or less than 200 feet (61 m.).

Horizontal diversity - The distribution and abundance of different plant and animal communities or successional stages across an area of land; the greater the number of communities, the higher the degree of horizontal diversity.

I

Immediate suppression - Immediate control of wildfire as required by fuels and associated risk conditions.

Implementation - Those activities necessary to respond to the approved Land and Resource Management Plan.

Improvement cutting - Removing trees of undesirable species, form, or condition from the main canopy in stands past the sapling stage to improve the species composition and tree quality.

Incidental grazing - Grazing use that occurs on lands not managed for the production of domestic livestock. May occur as a result of natural herd movement, trailing of livestock, or the use of domestic livestock in recreation.

Indeterminate stands - A group of trees of similar age and species composition that has been invaded by other tree species to the point where the original group has lost its identify as a discrete unit.

Indirect outputs - Outputs caused by the action but which are later in time or farther removed in distance, although still reasonably foreseeable.

Individual (single) tree selection - The silvicultural method in which trees are removed individually, here and there, each year over an entire forest or stand. The resultant stand usually regenerates naturally and becomes uneven aged.

Individual tree selection cutting - Involves the removal of selected trees from specified age classes over the entire stand area in order to meet a predetermined goal of age distribution and species in the remaining stand.

Induced outputs - Outputs in the private sector induced by the direct outputs produced on the Forest.

Inherent edge - Naturally occurring breaks between two or more elements of the environment.

Indicator species - A plant or animal species adapted to a particular kind of environment. Its presence is sufficient indication that specific habitat conditions are also present.

Input/output analysis - A quantitative study of the interdependence of a group of activities based on the relationship between inputs and outputs of the activities. The basic tool of analysis is an input-output model for a given period that shows simultaneously for each economic sector the value of inputs and outputs, as well as the value of transactions within each economic sector. It has especially been applied to estimate the effects of changes in Forest output levels on local economic activity.

Insecticide - An agent used to control insect populations.

Instream flow - Those nonconsumptive in situ quantities of water necessary to meet seasonal stream flow requirements to accomplish the purposes of the National Forests, including, but not limited to, maintenance of favorable conditions of water flow, fisheries, visual quality, and recreational opportunities at acceptable levels.

Integrated pest management - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated population on various resource values, alternative regulation tactics and strategies and benefit/cost estimates of those alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides.

Intensive grazing - Grazing management that controls distribution of cattle and duration of use on the range, usually by fences, so parts of the range are rested during the growing season.

Intensive management - A high investment level of timber management that may include use of precommercial thinnings, commercial thinnings, genetically improved stock, and control of competing vegetation.

Interdisciplinary approach - The utilization of individuals representing two or more areas of knowledge and skills focusing on the same task, problem, or subject. Team member interaction provides necessary insight to all stages of the process.

Intermediate cutting - Any removal of trees from a stand between the time of its formation and the regeneration cut. Most commonly applied intermediate cuttings are release, thinning, improvement, and salvage.

Intermittent streams - A stream which flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas.

Intermountain Region - That part of the National Forest System which encompasses National Forests within the Intermountain Region (Utah, southern and central Idaho, western Wyoming, and Nevada).

Interpretive services - Visitor information services designed to present educational and recreational values to Forest visitors to enhance their understanding, appreciation, and enjoyment of the Forest.

Interpretive site - A developed site at which a broad range of natural or cultural history is interpreted or discussed for the enjoyment of the public.

Inventory data and information collection - The process of obtaining, storing, and using current inventory data appropriate for planning and managing the Forest.

Irretrievable - Applies to losses of production, harvest, or commitment of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible - Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

Issue - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

J

K

Kuchler vegetation types - Potential natural vegetation of the coterminous United States, classified by Kuchler.

Key summer range - That portion of the summer range essential for the continuation of both the pre- and post-reproductive cycles for all wildlife species.

Key winter range - The portion of the year-long range where big game find food and/or cover during severe winter weather.

L

Land class - The topographic relief of a unit of land. Land classes are separated by slope, which coincides with the timber inventory process. The three land classes used in the Forest Plan are defined by the following slope ranges: 0 to 35 percent; 36 to 55 percent; and greater than 55 percent.

Land exchange - The conveyance of non-Federal land or interests in the United States in exchange for National Forest System land or interests in land.

Landing - Any place where round timber is assembled for further transport, commonly with a change of method.

Landline - For Forest Plan purposes, National Forest property boundaries.

Landline location - Legal identification and accurate location of National Forest property boundaries.

Late forest succession - A stage of forest succession where the majority of trees are mature or overmature.

Landownership pattern - The National Forest System resource land base in relation to other landownerships within given boundaries.

"Leap frog" development patterns - Suburban sprawl with undeveloped parcels of land in between subdivisions. This type of development is usually considered inefficient because public utilities, services, etc., cannot be consolidated.

Limited surface occupancy - A mineral lease clause that recognizes an opportunity for occupancy but that requires further evaluation based on site-specific proposals.

Linear programing - A mathematical method used to determine the cost-effective allocation of limited resources between competing demands when both the objective; e.g., profit or cost, and the restrictions on its attainment are expressible as a system of linear equalities or inequalities; e.g., y=x+bx.

Local dependent industries - Industries relying on National Forest outputs for economic activity.

Local roads - Roads constructed and maintained for, and frequented by, the activities of a given resource element. Some use may be made by other element activities, but normally maintenance is not affected by such use. These roads connect terminal facilities with Forest collector or Forest arterial roads or public highways. The location and standard are usually determined by the requirements of a specific resource activity rather than by travel efficiency. Forest local roads may be developed and operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.

Logging residues - The unused portions of poletimber and sawtimber trees remaining after logging.

Long-term sustained yield timber capacity - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives.

M

M - Thousand

Management action - Any activity undertaken as part of the administration of the Forest.

Management area - An area of land with similar management goals and a common management prescription.

Management concern - An issue, problem, or a condition which constrains the range of management practices identified by the Forest Service in the planning process.

Management direction - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

Management intensity - A management practice or combination of management practices and associated costs designed to obtain different levels of goods and services.

Management Indicator Species (MIS) - A species selected because its population changes indicate effects of management activities on the plant and animal community. A species whose condition can be used to assess the impacts of management actions on a particular area.

Management opportunity - A statement of general actions, measures, or treatments that address a public issue or management concern in a favorable way.

Management practice - A specific activity, measure, course of action, or treatment.

Management prescription - Management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives.

Management program - A set of activities designed to achieve a specific outcome.

Management standards and guidelines - See standards and guidelines.

Mature timber - Trees that have attained full development, particularly height, and are in full seed production.

Market-value outputs - Goods and services valued in terms of what people are willing to pay for them, as evidenced by market transactions.

Maximum modification - See "Visual quality objectives."

MACRES - Thousand acres.

MAUM's - A symbol to indicate 1,000 animal unit months of livestock forage.

MBF - Thousand board feet, a measure of wood volume.

MCF - Thousand cubic feet, a measure of wood volume.

Mean annual increment of growth - The total increase in girth, diameter, basal area, height, or volume of individual trees, or a stand up to a given age divided by that age.

Middleground - The visible terrain beyond the foreground (approximately 1/2 to 5 miles from the viewer) where individual trees are still visible but do not stand out distinctly from the stand. (See "Foreground" and "Background.")

Mineral development - The preparation of a proven deposit for mining.

Mineral entry - The filing of a mining claim for public land to obtain the right to any minerals it may contain.

Mineral entry withdrawal - The exclusion of the right of exclusive possession by the locator, of locatable mineral deposits and mineral development work on areas required for administrative sites by the Forest Service and other areas highly valued by the public. Public lands withdrawn from entry under the general mining laws and/or the mineral leasing laws.

Mineral exploration - The search for valuable minerals on lands open to mineral entry.

Mineral fractions - Small, irregularly shaped parcels of National Forest lands created by the presence of a number of mining patents haphazardly located.

Mineral production - Extraction of mineral deposits.

Mineral soil - Weathered rock materials without any vegetative cover.

Minerals, common variety - Deposits which, although they may have value for use in trade, manufacture, the sciences, or in the mechanical or ornamental arts, do not possess a distinct, special economic value for such use over and above the normal uses of the general run of such deposits. May include sand, stone, gravel, pumicite, cinders, pumice (except that occurring in pieces over 2 inches on a side), clay, and petrified wood.

Minerals, leasable - Coal, oil, gas, phosphate, sodium, potassium, oil shale, sulphur, and geothermal steam.

Minerals, locatable - Those hardrock minerals which are mined and processed for the recovery of metals. May include certain nonmetallic minerals and uncommon varieties of mineral materials such as valuable and distinctive deposits of limestone or silica. May include any solid, natural inorganic substance occurring in the crust of the earth, except for the common varieties of mineral materials and leasable minerals.

Minimum level management - The management strategy that would meet only the basic statuatory requirements of administering unavoidable, nondiscretionary land uses; preventing damage to adjoining lands of other ownerships; and protecting the life, health, and safety of incidental users.

Mining claims - That portion of the public estate held for mining purposes in which the right of exclusive possession of locatable mineral deposits is vested in the locator of a deposit.

Mitigation - Actions to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice.

MM - Million.

MMBF - Million board feet.

MMCF - Million cubic feet.

Modification - See "Visual quality objectives."

Monitoring and evaluation - The periodic evaluation on a sample basis of Forest Plan management practices to determine how well objectives have been met and how closely management standards have been applied.

Mortality - Trees of commercial species, standing or down, that have died during a specified period, and were not cull trees at the time of death.

Mosaic of forest and openings - Areas with trees and areas without trees occurring in interrupted sequence.

Mountain Pine Beetle - A tiny black insect, ranging in size from 1/8 to 3/4 inch, that bores its way into the tree's cambium and cuts off its supply of food, thus killing the tree. This beetle attacks trees of the Pinus species only.

Multiple Use - The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

N

National Environmental Policy Act (NEPA) - An Act to declare a National policy which will encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

National Forest Land and Resource Management Plan - A Plan developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands of a given National Forest.

National Forest landscape management system - The art and science of planning and administering the use of Forest lands in such ways that the visual effects maintain or upgrade man's psychological welfare. It is the planning and design of the visual aspects of multiple-use land management.

National Forest Management Act (NFMA) - A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

National Forest System (NFS) lands - National Forests, National Grasslands, or purchase units, and other lands under the management of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

National Recreation Trails - Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the National system of trails authorized by the National Trails System Act. National Recreation Trails provide a variety of outdoor recreation uses in or reasonably accessible to urban areas.

National Register of Historic Places - A listing (maintained by the U.S. National Park Service) of areas which have been designated as being of historical significance. The Register includes places of local and state significance as well as those of value to the Nation.

National Wilderness Preservation System - All lands covered by the Wilderness Act and subsequent Wilderness designations, irrespective of the department having jurisdiction.

Natural barrier - A natural feature that will restrict livestock movements such as a dense stand of trees or downfall.

Natural catastrophic condition - A significant change in Forest conditions on the area that affects Forest Plan resource management objectives and their projected and scheduled outputs, uses, costs, and impacts on local communities and environmental quality.

NEPA - An abbreviation for the National Environmental Policy Act.

Nest survey - A method of estimating bird population size by counting the number of nests in a given area. (Also called nest count or eyrie count.)

Net public benefits - An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of net public benefits to be derived from management of units of the National Forest System is consistent with the principles of multiple use and sustained yield.

NFRS - Inventoried National Forest Recreation Sites.

No action alternative - The most likely condition expected to exist in the future if current management direction were to continue unchanged.

No surface occupancy - A mineral lease clause that permits passive activities such as seismic exploration or directional drilling from adjacent areas, but prohibits drilling or the occupancy of the surface.

Noncommercial vegetative treatment - The removal of trees for other than timber production purposes.

Noncommodity outputs - A resource output that cannot be bought and sold.

Nonconsumptive use - That use of a resource that does not reduce the supply. For example, nonconsumptive use of water includes hydroelectric power generation, boating, swimming, and fishing. Nonconsumptive use of wildlife is bird watching.

Nondeclining flow - The principle expressed by the definition of the base sale schedule.

Nonforest land - See "Timber classification."

Nongame - Species of animals which are not managed for sport hunting resource.

Nonpoint source pollution - Sources of pollution that are diffuse in origin, their transportation into receiving water not well defined or constant, their discharge occurring at many diffuse locations, and depending heavily on weather conditions such as rainstorms or snowmelt. Pollution from Forest management is of this type.

Nonmarket valued outputs - Goods and services not generally traded in the marketplace, but valued in terms of what reasonable people would be willing to pay for them rather than go without. Those obtaining the actual outputs do not necessarily pay what they would be willing to pay for them.

Nonwinter ranges - Any area of the Forest not included in the definition of big game winter range.

Notice of Intent - Written notice to the affected District Ranger, by those who intend to engage in mining activity on the Forest, of proposed prospecting, exploration, mining, and mineral processing activities. Also, a notice in the Federal Register of intent to prepare an environmental statement on a proposed action.

Noxious farm weeds - Those pernicious plant species occurring unnaturally on National Forest System lands that have the greatest potential of contributing to an unfavorable economic impact on crop or pasture land downstream.

NPB - An abbreviation of net public benefits.

O

Objective - A concise, time-specific statement of measurable planned results that respond to preestablished goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

Occupancy trespass - The illegal occupation or possession of National Forest land or property.

Off-road vehicle (ORV) - Vehicles such as motorcycles, all-terrain vehicles, four-wheel drive vehicles, and snowmobiles.

Old growth - A stand of trees that is past full maturity and showing decadence; the last stage in forest succession.

Old growth habitat - Habitat for certain wildlife that is characterized by overmature coniferous forest stands with large snags and decaying logs.

Oligotrophic - Lakes having low nutrient supplies which are poor producers of organic matter.

Operational costs - Those costs associated with administering and maintaining National Forest facilities and resource programs.

Operational Plan - A written document approved by the Forest Supervisor which provides specifically, at the project level, for implementation of the management direction established in the Forest Plan.

Opportunity - See management opportunity.

Optimum - A level of production that is consistent with other resource requirements as constrained by environmental, social, and economically sound conditions.

ORV - An abbreviation for off-road vehicles.

Outputs - The goods, services, products, and concerns which are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives. Goods, end products, or services that are purchased, consumed, or utilized directly by people. A broad term for describing any result, product, or service that a process or activity actually produces.

Overflow camping - Developed site camping that occurs in excess of designed site capacity.

Overmature timber - Trees that have attained full development, particularly in height, and are declining in vigor, health, and soundness.

Overstory - That portion of the trees, in a Forest or more than one story, forming the upper or uppermost canopy.

Overthrust belt - A narrow zone extending from Alaska to Mexico, which resulted from compressional stresses within the earth, and which is characterized by abundant large thrust faults.

P

PAOT - See "persons-at-one-time (PAOT)."

PARS - The burned acreage and fire occurrence guidelines which represent the annual average long-term fire loss. PARS are expressed by size class and fire intensity levels.

Partial retention - See "Visual quality objectives."

Particulates - Small particles suspended in the air and generally considered pollutants.

Patented mining claim - A patent is a document which conveys title to land. When patented, a mining claim becomes private property and is land over which the United States has no property rights, except as may be reserved in the patent. After a mining claim is patented, the owner does not have to comply with requirements of the General Mining Law or implementing regulations.

Payment in lieu of taxes - Payments to local or state governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing. Specifically, they include payments made under the Payments in Lieu of Taxes Act of 1976 by U.S. Department of the Interior.

Permitted grazing - Use of a National Forest range allotment under the terms of a grazing permit.

Personal use - Normally used to describe the type of permit issued for removal of wood products (firewood, post, poles, and Christmas trees) from National Forest land when the product is for home use and not to be resold for profit.

Persons-at-one-time (PAOT) - A recreation capacity measurement term indicating the number of people who can use a facility or area at one time.

Person-year - Approximately 2,080 working hours. May be filled by one person working year long or several people filling seasonal positions.

Physiographic surface - A land surface created by geological processes of intrusion, deposition, erosion, or structural movement.

Planned ignitions - A fire started by a deliberate management action.

Planning area - The area of National Forest land covered by a Regional Guide or Forest Plan.

Planning corridor - A general broad linear area of land used to evaluate where a specific right-of-way could be placed.

Planning criteria - Standards, tests, rules, and guidelines by which the planning process is conducted and upon which judgments and decisions are based.

Planning period - The 50-year time frame for which goods, services, and effects were projected in the development of the Forest Plan.

Planning questions - A major policy question of long-range significance, derived from the public issues and management concerns, to be decided when selecting among alternative Forest Plans.

Planning records - A system that records decisions and activities which result from the process of developing a Forest Plan, revision, or significant amendment.

Pole/sapling - A Forest successional stage in which trees between 3- and 7-inch diameter are the dominant vegetation.

Pole timber - Trees of at least 5 inches in diameter at breast height, but smaller than the minimum utilization standard for sawtimber.

Policy - A guiding principle which is based on a specific decision or set of decisions.

PNV - An abbreviation of present net value.

Practices - Those management activities that are proposed or expected to occur.

Precommercial thinning - The practice of removing some of the trees less than merchantable size from a stand so that the remaining trees will grow faster.

Predator - One that preys, destroys, or devours--usually an animal that lives by preying on other animals.

Preferred alternative - The alternative recommended for implementation in the Forest Plan.

Preparatory cut - The removal of trees near the end of a rotation, which permanently opens the canopy and enables the crowns of seed bearers to enlarge, to improve conditions for seed production and natural regeneration. Typically done in the shelterwood system.

Prescribed fire - A wildland fire burning under specified conditions which will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions. Plans for use of unplanned ignitions for this purpose must be approved by the Regional Forester.

Prescription - A predesignated set of criteria used to accomplish specific land and resource management objectives. See "Management prescription."

Presuppression - Activities organized in advance of fire occurrence to assure effective suppression action.

Primitive (ROS) - Recreation and wilderness opportunity spectrum classification characterized by an essentially unmodified environment, where trails may be present but structures are rare, and where probability of isolation from the sights and sounds of man is extremely high.

Primitive roads - Roads constructed with no regard for grade control or designed drainage, sometimes by merely repeatedly driving over an area. These roads are single lane, usually with native surfacing and sometimes passable with 4-wheel drive vehicles only, especially in wet weather.

Productive forest lands - Forest lands that are capable of producing crops of industrial wood and have not been reserved or deferred.

Production potential - The capability of the land or water to produce a given resource.

PROGNOSIS - A timber growth and yield computer model used to project per-acre growth and volume yield for commercial timber stands.

Program - When capitalized, the Renewable Resource Program required by the RPA. Generally, sets of activities or projects with specific objectives, defined in terms of specific results and responsibilities for accomplishment.

Program Budget - The fiscal planning document for estimating short- and long-range dollar needs by program area.

Program development and budgeting - The process by which activities for the Forest are proposed and funded.

Programed harvest - The part of the potential yield that is scheduled for harvesting. It is based on current demand, funding, and multiple use considerations.

Project administrative site - A site with facilities such as guard stations, project work cabins, and other facilities primarily existing for project purposes.

Project design - The process of developing specific information related to location, timing, activities, accountability, and control that result in the achievement of an objective or desired future condition.

Projects - Work schedule prescribed for a project area to accomplish management prescriptions. Projects can be for operation maintenance and protection (OMP) or for investment purposes. OMP projects are for ongoing work and are generally considered 1 year at a time. Investments can be of multi-year duration. A project is organized for managerial convenience, and is described by location, activities, outputs, effects, work force, dollars, time, and responsibility for execution.

Proponent interest - An individual or organization desiring to develop and operate a winter sports site.

Public access - Usually refers to a road or trail route over which a public agency claims a right-of-way for public use.

Proposed action - In terms of the National Environmental Policy Act, the project, activity, or decision that a Federal agency intends to implement or undertake.

Public issue - A subject or question of widespread public interest relating to management of the National Forest System.

Public participation - Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning.

Q

QRD - A decision aiding tool comprised of three separate parts: (1) Question analysis "Q," (2) rules "R," and (3) Data "D." Question analysis is the process of breaking a question into more detailed specific questions. Rules means the knowledge and assumptions whereby raw data is changed into information relating to the question. Once the question and rules are analyzed, then a determination can be made of the data needed to answer the question.

Quad maps - Standard U.S. Geological Survey quadrangle maps.

Quality management (range) - Management of the range ecosystem where vegetation production is being maximized, soil disturbance is minimal, and animal production is high. Impacts to the environment are low.

R

RA - Abbreviation for range analysis.

Range - Lands producing native forage for animal consumption and lands that are revegetated naturally or artificially to provide forage cover that is managed like native vegetation, which are amenable to certain range management principles or practices.

Range allotment - An area designated for use of a prescribed number and kind of livestock under one management plan.

Range condition - The state of health of the range based on what it is naturally capable of producing.

Ranger District - Administrative subdivisions of the Forest supervised by a District Ranger who reports to the Forest Supervisor.

Raptors - Bird of prey with a strong notched beak and sharp talons, such as the eagle, hawk, owl, etc.

RARE II - See Roadless Area Review and Evaluation II.

Real dollar value - A monetary value that compensates for the effects of inflation.

Receipts - Money collected from timber stumpage, livestock grazing, campgrounds, and special use permits, which returns to the federal treasury.

Record of Decision - A document separate from but associated with an Environmental Impact Statement that publicly and officially discloses the responsible official's decision on which alternative assessed in the Environmental Impact Statement to implement.

Recreation capacity - The number of people, based on planning and design, that can take advantage of the recreation opportunity at any one time without substantially diminishing the quality of the experience sought after.

Recreation experience level - A classification (using a 1 to 5 scale) of the level of development in camp and picnic sites as to the types of recreation opportunities and modifications to the environment that can be expected.

Recreation Information Management (RIM) - The Forest Service computer-oriented system for the management of recreation information; i.e., use, costs, facility conditions, inventories, etc.

Recreation management area - An area of several thousand acres where the management emphasis is on recreation and where there is direction given to establish a Recreation Area Management Plan.

Recreation opportunity - Availability of a real choice for a user to participate in a preferred activity within a preferred setting, in order to realize those satisfying experiences which are desired.

Recreation Opportunity Spectrum (ROS) - Land classification system which categorizes land into six classes, each being defined by its setting and by the probable recreation experiences and activities it affords. The six management areas are: urban, rural, roaded natural, semi-primitive motorized, semiprimitive nonmotorized, and primitive.

Recreation (PAOT) - Refers to people at one time that occupy a given campground, picnic area, or any other developed recreation area.

Recreation residences - Houses or cabins on National Forest land that are not the primary residence of the owner.

Recreation visitor day (RVD) - Twelve visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

Recreational livestock - Animals used primarily in conjunction with recreation such as horses, mules, etc.

Reforestation - The natural or artificial restocking of an area with forest trees.

Reduced service management (RSM) - Reduced service management, or less than standard management, refers to recreation administration, operation, and maintenance at a level below established standards and management objectives (due to inadequate funding).

Regeneration - The renewal of a tree crop, whether by natural or artificial means. Also, the young crop itself, which commonly is referred to a reproduction.

Region - For Regional planning purposes, the standard administrative Region of the Forest Service, administered by the official responsible for preparing a Regional Guide.

Regional analysis areas - Geographic areas within the Region that encompass several Forests or Grasslands.

Regional Forester - The official responsible for administering a single Region.

Regional Guide - The guide developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands of a given Region. It also disaggregates the RPA objectives assigned to the Region to the Forests within that Region.

Regulations - Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers management of the Forest Service.

Removal cut (final cut) - The removal of the last seed bearers or shelter trees after regeneration is established under a shelterwood method.

Research Natural Areas (RNA) - An area in as near a natural condition as possible which exemplifies typical or unique vegetation and associated biotic, soil, geologic, and aquatic features. The area is set aside to preserve a representative sample of an ecological community primarily for scientific and educational purposes; commercial and general public use is not allowed.

Residual stand - The trees remaining standing after some event such as selection cutting.

Residual utilization - Removal and use of forest residue (such as slash, litter, brush, snags) for energy production, home heating, or wood products.

Resource allocation model - A mathematical model using linear programing which will designate land to prescriptions and schedule implementation of those prescriptions simultaneously. The purpose of the model is to find a schedule and allocation that meets the goals of the Forest and optimizes some objective function such as "minimize costs."

Resource element - A major Forest Service mission-oriented endeavor which fulfills statutory or executive requirements and compromises a collection of activities from the various operating programs required to accomplish the mission. The twelve resource elements are: Recreation, wilderness, wildlife and fish, range, timber, water-soil-air, minerals, human and community development, lands, facilities, protection, and general administration.

Resource Management Plan - A plan developed prior to the Forest Plan that outlines the activities and projects for a particular resource element independently of considerations for other resources. Such plans are superseded by the Forest Plan.

Resource use and development opportunities - A possible action, measure, or treatment and corresponding goods and services identified and introduced during the scopping process which subsequently may be incorporated into and addressed by the Land and Resource Management Plan in terms of a management prescription.

Responsible official - The Forest Service employee who has been delegated the authority to carry out a specific planning action.

Retention - See "Visual quality objectives."

Retrogressive vegetative succession - A reversal of the usual ecological trend toward more complex and stable plant communities.

Right-of-way - An accurately located strip of land with defined width, point of beginning, and point of ending. It is the area within which the user has authority to conduct operations approved or granted by the landowner in an authorizing document, such as a permit, easement, lease, license, or Memorandum of Understanding (MOU).

Riparian areas - Areas of land that are directly influenced by water. They usually have visible vegetative or physical characteristics reflecting this water influence. Stream sides, lake borders, or marshes are typical riparian areas. At a minimum, riparian areas include all land within 100 feet of the high water marks of lakes, streams, and marshes.

Riparian ecosystems - A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem and is identified by soil characteristics and distinctive vegetation communities that require free or unbounded water.

Road maintenance levels - Levels are described as follows:

Level 1. Road normally closed to vehicle traffic.

Level 2. Road open for limited passage of traffic but not normally suitable for passenger cars.

Level 3. Road open for public traffic including passenger cars, but may not be smooth or comfortable.

Level 4. Road suitable for all types of vehicles, generally smooth to travel, and dust may be controlled.

Level 5. Road is smooth and dust free, and the surface is skid resistant if paved.

Roaded natural - Recreation opportunity spectrum classification that characterizes a predominately natural environment with evidence of moderate permanent resource alteration and utilization. Evidence of the sights and sounds of man is moderate, but in harmony with the natural environment. Opportunities exist for both social interaction and moderate isolation from sights and sounds of man.

Roadless Area Review and Evaluation II (RARE II) - The national inventory of roadless and undeveloped areas within the National Forests and Grasslands. This refers to the second such assessment which was documented in the Final Environmental Impact Statement of the Roadless Area Review and Evaluation, January 1979.

Rotation - The planned number of years between the formation of a regeneration of trees and its final cutting at a specified stage of maturity.

Roundwood - Timber and fuelwood prepared in the round state--from felled trees to material trimmed, barked, and crosscut (logs, transmission poles, etc.

RPA Program - The Forest and Rangeland Renewable Resources Planning Act of 1974. Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of the Act. The most recent recommended program was done in 1980.

RSM - See "reduced service management."

Rural (ROS) - Recreation opportunity spectrum classification that characterizes an area in which the sights and sound of man are prevalent and the landscape has been considerably altered by the works of man.

RVD's - An abbreviation of recreation visitor days.

S

Sale schedule - The quantity of timber planned for sale by time period from an area of suitable land covered by a Forest Plan. The first period, usually a decade, of the selected sale schedule provides the allowable sale quantity. Future periods are shown to establish that long-term sustained yield will be achieved and maintained.

Saleables - See "Minerals, common variety."

Salvage cutting - The harvest of trees that are dead, dying, or deteriorating because they are overmature or have been materially damaged by fire, wind, insects, fungi, or other injurious agencies, before their timber becomes worthless.

Sanitation cutting - The removal of dead, damaged, or susceptible trees, done primarily to prevent the spread of pests or pathogens and so promote Forest hygiene.

Sawtimber - Live trees that equal or exceed the minimum utilization standard for sawtimber.

Scenic areas - Places of outstanding or matchless beauty which require special management to preserve these qualities. They may be established under 36 CFR 294.1 whenever lands possessing outstanding or unique natural beauty warrant this classification.

Scenic easement - An interest in the land of another which allows the easement holder specified uses or rights without actual ownership of the land. In this case, control of the use of land adjacent to public highways, parks, and rivers. It may provide something attractive to look at within the easement area, an open area to look through to see something attractive beyond the easement itself, or a screen to block out an unsightly view beyond the easement area.

Scopping process - A continuing process throughout the environmental analysis for planning and management activities. It may involve a series of meetings, telephone conversations, or written comments from different interested groups.

Second growth - Forest growth that has become established after some interference with the previous Forest crop; e.g., cutting, serious fire, or insect attack.

Security area - Habitat which, because of its size, topography, and vegetation, is capable of holding animals during periods of stress. The size of area varies with the combination of space and hiding cover necessary for animals to be psychologically secure in relation to the degree of human access.

Seed tree cutting - Removal in one cut of the mature timber crop from an area, except for a small number of seed bearers left singly or in small groups.

Seedlings and saplings - Live trees less than 5 inches in diameter at breast height.

Selected alternative - The alternative recommended for implementation as the Forest Plan based on the evaluation completed in the planning process.

Selection - See "Group selection" and "Individual (single) tree selection."

Semi-primitive motorized (ROS) - Recreation opportunity spectrum classification characterized by few or subtle changes by man, and with a moderate probability of isolation from the sights and sounds of man, except for the evidence of primitive roads and/or trails.

Semiprimitive nonmotorized (ROS) - Recreation opportunity spectrum classification characterized by a few or subtle changes by man, with a high probability of isolation from the sights and sounds of man.

Sensitive species - Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alternations.

Sensitivity level - A particular degree of measure of viewer interest in scenic qualities of the landscape. Three sensitivity levels are employed, each identifying a different level of user concern for the visual environment:

Level 1 - Highest sensitivity
Level 2 - Average sensitivity
Level 3 - Lowest sensitivity

Shade-intolerant plants - Plant species that do not germinate or grow well in the shade.

Shade-tolerant plants - Plants that grow well in shade.

Shelterwood - Silvicultural methods in which, in order to provide a source of seed and/or protection for regeneration, the old crop (the shelterwood) is removed in two or more successive shelterwood cuttings. The first cutting is ordinarily the seed cutting, though it may be preceded by a preparatory cutting, and the last is the final cutting. Any intervening cutting is termed removal cutting. An even-aged stand results.

Seral condition - The unique characteristics of a biotic community which is a developmental, transitory stage in an orderly ecologic succession involving changes in species, structure, and community processes with time.

Shrub/seedling - A Forest successional stage in which shrubs and seedling trees are the dominant vegetation.

Sight distance - The distance at which 90 percent or more of a deer or elk is hidden from an observer. Hiding cover exists when 90 percent or more of a standing deer or elk is hidden at a distance of 200 feet or less.

Silvicultural examination - The process used to gather the detailed in-place field data needed to determine management opportunities and direction for the timber resource within a small subdivision of a Forest area such as a stand.

Silvicultural system - A management process whereby Forests are tended, harvested, and replaced, resulting in a Forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of Forest thereby produced.

Single-tree selection - See "Individual (single) tree selection."

Site index - A numerical evaluation of the quality of land for plant productivity, commonly used as a measurement of site productivity in stands of commercial timber and referenced to a base tree age of 50 or 100 years. The index value is expressed in feet of total height a dominant tree of a given species should reach at the base age under intensive management.

Site preparation - A general term for removing unwanted vegetation, slash, roots and stones from a site before reforestation.

Site productivity - Production capability of specific areas of land.

Size class - For the purposes of Forest planning, size class refers to the three intervals of tree stem diameter used for classification of timber in the Forest Plan data base.

- less than 5-inch diameter = seedling/sapling
- 5- to 7-inch diameter = pole timber
- greater than 7-inch diameter = sawtimber

Skidding - A loose term for hauling loads by sliding, not on wheels, as developed originally from stump to roadside, deck, skidway, or other landing.

Skier day - Measure of downhill skiing use equivalent to one person skiing for 8 hours.

Slash - The residue left on the ground after timber cutting and/or accumulation as a result of storm, fire, or other damage. It includes unused logs, uprooted stumps, broken or uprooted stems, branches, twigs, leaves, bark, and chips.

Slope slump - A slide or earthflow of a soil mass.

Small game - Birds and small mammals normally hunted or trapped.

Snag - A nonliving standing tree. The interior of the snag may be sound or rotted.

Social disruption - The disruption or breaking up of people's lives, especially in their dealings with each other.

Society of American Foresters (SAF) forest and cover types - A forest type is a descriptive term used to group stands of similar character in regards to composition and development due to given ecological factors, by which they may be differentiated from other groups of stands. The term suggests repetition of the same character under similar conditions. A cover type is a forest type now occupying the ground, no implication being conveyed as to whether it is temporary or permanent.

Soil Compaction - Reduction of soil volume which results in alternation of soil, chemical, and physical properties.

Soil productivity - The capacity of a soil to produce a specific crop such as fiber, forage, etc., under defined levels of management. Productivity is generally dependent on available soil moisture and nutrients and length of growing season.

Soil profile - A progression of distinct layers of soil from the surface to bedrock.

Soil surveys - Systematic examinations of soils in the field and in laboratories; such examinations are at differing "orders" and interpretation according to their adaptability for various crops, grasses, and trees; there are five classed orders of surveys, with order 1 being the highest intensity through order 5 (lowest intensity).

Sound wood - Timber that is free from defect, damage, or decay; i.e., in solid, whole, good condition.

Special interest area - Areas established and managed for their unique special features.

Special Use Permit - A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest land for some special purpose.

Spring break-up - The time of year when roads break up due to melting frost and ice, generally from the first of March to the middle of April.

Stand (tree stand) - An aggregation of trees or other vegetation occupying a specific area and sufficiently uniform in composition (species), age arrangement, and condition as to be distinguishable from the Forest or other vegetation or other land cover on adjoining areas.

Stand examination surveys - Procedures consisting of seven types of surveys used to collect data on Forest stands. Types 1 through 4 are conducted by using intensive specified standard procedures. Types 5 through 7 are less intensive examinations consisting of modifications to procedures used in Type 1 through 4 surveys.

Stand size class - A classification of forest land based on the predominant size of trees present; that is, sawtimber, poletimber, seedling-sapling.

Standard and guideline - A principle requiring a specific level of attainment, a rule to measure against; a mandatory requirement.

State Air Quality Regulations - The legal base for control of air pollution sources in that state. Prescribed burning is generally covered under these regulations.

State Implementation Plan - A State Plan that covers implementation, maintenance, and enforcement of primary and secondary standards in each air quality control region, pursuant to Section 110 of the Clean Air Act.

Strategic minerals - Those minerals of which the U.S. imports 50 percent of more from foreign sources (based on 1978 U.S. Bureau of Mines figures).

Stream - A water course having a distinct natural bed and banks; a permanent source which provides water at least periodically; and at least periodic or seasonal flows at times when other recognized streams in the same area are flowing.

Successional stage - A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax; for example, coniferous forests in the Blue Mountains progress through six recognized stages: grass-forb; shrub-seedling; pole-sapling; young; mature; old growth.

Suitability - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land which may be suitable for a variety of individual or combined management practices.

Suitability analysis - Process of identifying lands to be managed for timber production. Stage 1 identifies the biologically capable, administratively available, and technically suitable lands. Stage II consists of an economic analysis of costs and benefits of timber management on the lands identified in Stage I. Stage III provides the final allocation of suitable lands based on Forest objectives and economic efficiency. Stages II and III are completed with the FORPLAN model.

Suitable Forest land - Lands allocated to timber management as a result of the three-stage suitability analysis.

Supply - A schedule of the quantity of a product or Forest output that will be produced at various prices.

Supply potential - The output production possible from the available resources.

Suppression - An act extinguishing or confining fire.

Surface resources - Renewable resources located on the earth's surface in contrast to ground water and mineral resources located below the earth's surface.

Sustained yield of products and services - The achievement of maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest without impairment of the productivity of the land.

T

Targets - A quantifiable output. Assignments made to the Forest by the Regional Forester.

Technically suitable forest land - Land for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions. There is reasonable assurance that such lands can be adequately restocked as provided in 36 CFR 219.27(c)(3).

Temporary road - A road that will be physically obliterated and seeded after its primary use is completed; e.g., spur road for logging.

Thermal cover - Cover used by animals to ameliorate effects of weather; for elk, a stand of coniferous trees 40 feet or taller with an average crown closure or 70 percent or more.

Thinning - A felling made in an immature stand primarily to maintain or accelerate diameter increment and also to improve the average form of the remaining trees without permanently breaking the canopy. An intermediate cutting.

Threatened species - Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future.

Tiering - Refers to the coverage of general matters in broader Environmental Impact Statements (such as National program or policy statements) with subsequent narrower statements or environmental analyses (such as Regional or Basin-wide program statements or ultimately site-specific statements) incorporating, by reference, the general discussions and concentrating solely on the issues specific to the statement subsequently prepared.

Timber base - The lands within the Forest capable, available, and suitable for timber production.

Timber classification - Forested land is classified under each of the land management alternatives according to how it relates to the management of the timber resource. The following are definitions of timber classifications used for this purpose:

1. Nonforest land - Lands never having or incapable of having greater than 10 percent of the area occupied by forest trees and lands formerly forested and currently developed for nonforest use.

2. Forest land - Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for nonforest use. Lands developed for nonforest use include areas for crops, improved pasture, residential, or administrative areas, improved roads of any width and adjoining road clearing and powerline clearing of any width. The term

occupancy when used to define forest land will be measured by canopy cover of live forest trees at maturity. The minimum area for classification of forest land is one acre. Unimproved roads, trails, streams, and clearings in forest areas are classified as forest if they are less than 120 feet in width.

3. Suitable forest land - Land that is managed for timber production on a regulated basis.

4. Unsuitable forest land (not suited) - Forest land that is not managed for timber production because: (1) the land has been withdrawn by Congress, Secretary, or Chief; (2) technology is not available to prevent irreversible damage to soils, productivity, or watershed conditions; (3) there is no reasonable assurance that lands can be adequately restocked within 5 years after final harvest based on existing technology and knowledge; (4) there is at present, a lack of adequate information to responses to timber management activities; or (5) timber management is inconsistent with or not cost-efficient in meeting the management requirements and multiple-use objectives specified in the Forest Plan.

5. Tentatively suitable (commercial forest land) - Forest land which is producing or is capable of producing crops of industrial wood and (1) has not been withdrawn by Congress, the Secretary, or Chief; (2) existing technology and knowledge is available to ensure timber production without irreversible damage to soils, productivity, or watershed conditions; and (3) existing technology and knowledge provides reasonable assurance that adequate restocking can be attained within 5 years after final harvesting.

Timber harvest schedule - See "Sale schedule."

Timber production - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use. For purposes of Forest planning, the term "timber production" does not include production of fuelwood or harvest of unsuitable lands.

Timber stand improvement (TSI) - Measures such as thinning, pruning, release cutting, prescribed fire, girdling, weeding, or poisoning of unwanted trees aimed at improving growing condition of the remaining trees.

Tractor logging - Any logging method which uses a tractor as the motive power for transporting logs from the stumps to a collecting point--whether by dragging or carrying the logs.

Tradeoff Evaluation Process (TEP) - A process whereby factors, issues, elements, etc., are evaluated with regard to the tradeoffs that would occur.

Trail maintenance level - One of the categories outlined in the Management Information Handbook describing the type and intensity of maintenance for trails.

Transitory range - Land that is suitable for livestock use of a nonenduring nature over a period of time. For example, on particularly disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage.

Travel management - The administrative decisions on the location and timing of road and trail closures.

Treatment area - The site-specific location of a resource improvement activity.

Tree opening - An opening in the forest cover created by the application of even-aged silvicultural practices.

Type conversion - The conversion of the dominant vegetation in an area from forested to nonforested or from one tree species to another.

U

Understory - The trees and other woody species growing under a more-or-less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

Uneven-aged management - The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single tree selection and group selection.

Uneven-aged silviculture - The combination of actions that result in the maintenance or creation of forests or stands of trees, in which trees of several or many ages grow together. Cutting methods that develop and maintain uneven-aged stands are individual tree and group selection cutting methods:

Individual tree selection cutting. The removal of selected trees of all size classes on an individual basis.

Group selection cutting. The removal of selected trees of all size classes in groups of a fraction or an acre up to two or three acres in size.

Unpatented mining claim - See "Mining claim."

Unplanned ignition - A fire started at random by either natural or human causes, or a deliberate incendiary fire.

Unregulated harvest - This harvest is not charged against the allowable sale quantity, and includes occasional volumes removed that were not recognized in calculations of the allowable sale quantity, such as cull or dead material and noncommercial species and products. It also includes all volume removed from nonsuitable areas. Harvests from nonsuitable areas will be programed as needed for objectives such as research on experimental Forests, to meet multiple use objectives other than timber production, and for improvement of administrative sites.

Unsuitable lands - See "Timber classification."

Utilization standards - Standards guiding the projection of timber yields and the use and removal of timber. The standards are described in terms of minimum diameter at breast height, minimum length, and percent soundness of the wood, as appropriate.

Utilization standards - Standards guiding the use and removal of timber. They are measured in terms of diameter at breast height (DBH) and type of the tree inside the bark (top DIB), and percent "soundness" of the wood.

V

Variable strip transect - A method of bird population estimation in which a fixed line of a given length and a variable width is walked and the bird species and numbers are recorded. (Ref. Emlen, J. T., 1971.; Population Densities Derived from Transect Counts. Auk 88: 323-342.)

Variety class - A classification system for establishing three landscape categories. This classification system is based on the premise that all landscapes have some visual values, but those with the most variety or diversity of visual features have the greatest potential for high scenic value. A particular level of visual variety or diversity of landscape character.

Vegetative management - Activities designed primarily to promote the health of the Forest cover for multiple-use purposes.

Vertical diversity - The diversity in a stand that results from the complexity of the above-ground structure of the vegetation; the more tiers of vegetation.

Visual absorption capability - The ability of the landscape to conceal evidence of human modifications. Rated as high, moderate, and low.

Viable populations - A number of individuals of a species sufficient to ensure the long-term existence of the species in natural self-sustaining populations adequately distributed throughout their region.

Visitor Information Service (VIS) - Activities which interpret for visitors, in layman's language, Forest management, protection, utilization, and research. It also includes interpreting the local botany, geology, ecology, zoology, history, and archaeology.

Visual quality objective - A desired level of excellence based on physical and sociological characteristics of an area. Refers to degree of acceptable alteration of the characteristic landscape.

Enhancement - A short-term management alternative which is done with the express purpose of increasing positive visual variety where little variety now exists.

READEX FICHE

Maximum modification - A visual quality objective meaning man's activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background.

Modification - A visual quality objective meaning man's activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

Partial retention - A visual quality objective which, in general, means man's activities may be evident but must remain subordinate to the characteristic landscape.

Preservation - A visual quality objective that provides for ecological change only.

Rehabilitation - A short-term management alternative used to return existing visual impacts in the natural landscape to a desired visual quality.

Retention - A visual quality objective which, in general, means man's activities are not evident to the casual forest visitor.

Visual resource - The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

VQO - An abbreviation of visual quality objective.

W

Water rights - Rights to divert and use water or to use it in place.

Water yield - The measured output of the Forest's streams.

Water yield increase - Additional water released to the Forest streams as a result of Forest management activities.

Watershed - The entire area that contributes water to a drainage system or stream.

Wetlands - Areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances, does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Wilderness - Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint of man's activity substantially unnoticeable; have outstanding opportunities for solitude or a primitive and unconfined type of recreation;

include at least 5,000 acres or is of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

Under the current management situation, roadless areas will be handled in the Forest Plan as follows:

1. Nonwilderness roadless areas - On February 1, 1983, the Secretary of Agriculture made a decision to reevaluate RARE II roadless areas as a result of the Ninth Circuit Court of Appeals decision in California v. Block. Pending any legislative changes, the reevaluation will be conducted during the Forest land and resource management planning process and will include, in addition to further planning areas, roadless areas recommended for wilderness in RARE II and areas that were administratively designated for nonwilderness uses. Activities in nonwilderness areas will continue under existing Plans, pending completion of the Forest Plans.

2. Wilderness and primitive areas - These areas will be managed to protect their wilderness characteristics as provided for through the Wilderness Act of 1964 and subsequent designating legislation.

3. Recommended wilderness - These areas have already been recommended as suitable for inclusion as wilderness areas through the RARE II process but will be reevaluated in Forest planning. These areas may be considered for designation by Congress prior to completion of the Forest Plans.

4. Further planning areas - These areas will be considered for wilderness or nonwilderness during the development of Forest Land and Resource Management Plans. Decisions on the suitability or unsuitability of the areas for wilderness designation will be made in the Forest Plan. Suitable areas will be recommended to Congress for inclusion in the National Wilderness Preservation System. (The matter goes before Congress for final decision.) If not found suitable, Congress will be notified by letter of a decision of unsuitability in the Forest Plan. A 90-day waiting period is necessary while Congress is in session before a decision of unsuitability can be implemented.

Interim management direction for recommended wilderness and further planning areas protects their wilderness characteristics until the final decisions are made. The areas are not available for timber harvest, road construction, or other activities that reduce wilderness potential. Entry into the areas for the exploration, development, and production of minerals is permitted under the 1872 mining laws. Mineral leasing in further planning areas includes a stipulation that requires a sequential review and approval of operations. This requires confirmation that succeeding operations are warranted by information collected in the preceding stage.

Wildfire - Any wildland fire that is not a prescribed fire.

Wildlife habitat diversity - The distribution and abundance of different plant and animal communities and species within a specific area.

Window - A critical segment of terrain through which right-of-way could pass in traversing from point of origin to destination.

Winter range - See "Big game winter range."

Withdrawal - An order removing specific land areas from availability for certain uses.

Wood fiber production - The growing, tending, harvesting, and regeneration of harvestable trees.

Woodland products - Harvestable items obtained from pinyon-juniper woodlands, such as fuelwood, posts, pine nuts, and Christmas trees. The products can be commercially harvested or taken for personal use.

Work center - A facility where crews assemble and are directed toward their various work assignments. A work center can be located at an administrative site. A work center normally will include storage and warehousing facilities and may include crew housing.

X

Y

Year-round economies - Economies based on employees working year-round as opposed to seasonal employment.

Yield table - A table listing merchantable per-acre timber volumes at given tree ages or sizes typically generated by a timber growth and yield computer model such as PROGNOSIS.

Z

Zone of influence (ZOI) - The area influenced by Forest Service management activities.

APPENDIX D

INTRODUCTION

The Forest planning process recognizes the importance of energy transportation and utility corridor/window evaluation and designation at the National, State, and local level for meeting future linear right-of-way (ROW) needs. The planning process specifically recognizes the demand for major energy related north-south energy transportation corridors in southwestern Utah, northeastern Nevada, and northern Arizona. This demand is founded upon existing and proposed high voltage/extra high voltage electrical transmission lines, proposed interstate gas pipelines, and proposed slurry pipelines and/or railroad transport of extensive coal resources in southwestern Utah.

The Dixie National Forest has identified energy transportation and utility corridor/window evaluation and designation as a key element in the Forest planning process. This element is addressed as a resource use in the Forest Land and Resource Management Plan and associated Environmental Impact Statement.

Selecting corridors/windows for linear facilities within the Forest is complicated by numerous restrictions within certain land areas. Foremost among these are the proximity of two national parks and one national monument (Bryce Canyon and Capitol Reef National Parks and Cedar Breaks National Monument), three wilderness areas (Pine Valley Mountain, Ashdown Gorge, and Box-Death Hollow), and steep and rugged terrain features covering major portions of the Forest. The planning process includes firm direction for protecting sensitive resource values within and adjacent to such constrained land areas.

The corridor/window planning direction follows the Forest Service Manual and Regional Plan guidelines for energy transportation and utility corridor planning. These guidelines have been written to assist National Forests in addressing the complications encountered in corridor/window evaluation and designation.

The corridor/window planning process on the Forest has been coordinated with the Cedar City Bureau of Land Management District, the National Park Service, and concerned private and public utilities operating within and outside of the State of Utah. This coordination provided the basis for inventories, evaluations, and resulting corridor/window designations. The primary goals of the planning process are to: 1) address the energy transportation demands as presented by industry, 2) designate corridors/windows that can be supported by other Federal and State agencies, and industry, and 3) assure protection and proper management of natural resource values within and adjacent to the proposed corridor/window areas.

DEFINITIONS OF UTILITY DESIGNATION TERMS

Corridor. A linear strip of land which has ecological, technical, economic, social or similar advantages over other areas for the present or future location of energy transportation or utility rights-of-way within its boundaries.

Rights-of-Way. Land authorized to be used or occupied for the construction, operation, maintenance, and terminous of a project facility passing over, upon, under or through such land.

Window. A critical segment of terrain through which rights-of-way could pass in traversing from points of origin to designation.

Exclusion Area. An area having a statutory prohibition to rights-of-way for linear facilities or corridor/window designation.

Avoidance Area. An area that poses particular environmental, institutional or statutory effects which would be difficult or impossible to mitigate or has characteristics which impose unusual engineering constraints.

OBJECTIVES

The objectives in applying the Service-wide and Regional direction for energy transportation and utility corridor/window planning are to: (listed in a planning sequence)

1. Inventory and field check existing pipelines, electric transmission lines, and major transportation routes which are located on the Forest; (Transportation routes are inventoried as potential corridors for electrical transmission and pipeline facilities; not for expansion of or addition to the State/Interstate Road/Highway System)

2. Identify criteria which will be used to evaluate potential corridors/windows;

3. Analyze suitability of routes or areas to handle new or additional facilities and the suitability of the routes or areas for overhead vs. underground vs. surface linear right-of-way facilities;

4. Evaluate and designate areas suitable for corridors/windows on the Dixie National Forest within the land management planning process;

5. Consolidate right-of-way alignments into designated corridors/windows to avoid the proliferation of separate linear rights-of-way.

MANAGEMENT DIRECTION FOR ACHIEVING OBJECTIVES

General Direction. Generally where the purpose of the transportation, transmission, or pipeline route is to accommodate or service a particular end use on the Forest, the route followed is not considered as a potential corridor. Where existing rights-of-way pass into or through Forest lands, within an identifiable strip of land, and where the probability exists that other energy transportation systems may be located within, the strip is considered for designation as a corridor.

Before new corridors/windows or widening of existing corridors/windows are approved, consideration will be given to wheeling, uprating, or multiple circuiting of transmission lines; increasing gas and oil pipeline capacity by addition of compressors or looping; or utilizing existing highway transportation rights-of-way.

Specific Direction. Specific direction is related to utility sizes, existing rights-of-way, and restrictions on future corridor locations.

The description of general utility sizes and rights-of-way to be used in the evaluation process are:

a. Electric transmission lines 69 kv and above;[1]
b. Oil, gas, or slurry pipelines 10 inches in diameter or larger;[1]
c. Federal, State, and Interstate Highways[2]; and
d. Complex, extensive, and/or concentrated hydropower penstock (pipeline) systems.

[1] Inclusion of lower rated transmission lines or smaller pipelines within designated corridors/windows would be permitted.

[2] Federal and State Highway routes are considered as portions of potential corridor or windows for energy transportation facilities. These highway routes are not evaluated in this report for the purpose of potential expansion or upgrading of Forest highway systems.

Identification and designation of existing energy transportation rights-of-way as corridors that:

1. Comply with evaluation criteria for determination of corridor/window suitability; and
2. Are desirable for retention, but not capable of further widening; or
3. Are desirable to retain and have widening potential for future uses; and
4. Agree with the potential corridor/window designations on public or state lands and the corridor/window designations of adjacent National Forests.

Based on the most current planning information from utility and power administrations, the Dixie National Forest has directed planning for future energy/transportation rights-of-way and associated corridors by:

1. Designating planning window[3]; or
2. Identifying constrained areas where future energy transportation rights-of-way will be discouraged or denied - such areas are identified as:
   a. Avoidance area[3,4]; or
   b. Exclusion area[5].

APPROACHES FOR CORRIDOR EVALUATION AND SELECTION

Three approaches for evaluating and designating corridors/windows will be followed in this evaluation report. These are:

1. Direct (where facilities can be placed). Identification/evaluation of land areas for designation as long linear corridors or windows.

2. Indirect (where facilities cannot be placed). Identification/evaluation of land areas where facilities may not or will not be placed, by classifying the areas as avoidance areas or exclusion areas.

3. Direct and Indirect Combined. Combination of the above to: (a) identify, evaluate, and designate important right-of-way areas; and (b) identify, evaluate, and designate areas exhibiting important natural, cultural, and social values.

[3] Windows and avoidance areas are to be evaluated and designated upon application of evaluation criteria for determining corridor suitability.

[4] Applications for linear rights-of-way within avoidance areas would be processed by the Forest if, after project evaluation, it was determined that proposed mitigation measures would meet the management standards and guidelines for the various resources within the areas.

[5] Applications for linear rights-of-way within exclusion areas would not be processed, due to the statutory prohibitions applicable to the area in question.

(Refer to Attachment, Exhibit 1 for a detailed discussion on these three approaches.)

INVENTORY OF EXISTING RIGHTS-OF-WAY THAT MEET STANDARDS FOR POTENTIAL CORRIDOR DESIGNATION

Electrical transmission lines[6] and major Federal/State road and highway rights-of-way, currently existing on the Dixie National Forest, are displayed in Tables A and B, respectively.

No rights-of-way exist on the Forest for slurry pipelines or railroads.

The existing oil and gas pipeline rights-of-way (Upper Valley Oil Field) do not meet the General and Specific evaluation direction as discussed on page 4; therefore, these rights-of-way do not qualify for evaluation and potential corridor designation[6].

The existing three foot, 4.1 mile hydropower penstock on the Escalante Ranger District also does not meet the General and Specific evaluation direction as discussed on pages 2 and 3; therefore, this right-of-way does not qualify for evaluation and potential corridor designation[6].

[6] Right-of-way expansion on these rights-of-way will be controlled by mitigation measures established for the adjacent avoidance area designations.

TABLE A
EXISTING ELECTRICAL TRANSMISSION LINES

Name	Location Beginning-Ending	Size (KV)	R/W Width (Feet)	Length (Miles)	Area (Acres)
Intermountain Power Project	Newcastle to Central (Pine Valley RD[a])	500 kV dc	200.0	21.0	509.0
Utah Power & Light Co. Line 1	Cedar City west substation to Newcastle to Central to St. George (Pine Valley RD)	138 kV	50.0	14.33	86.79
Utah Power & Light Co. Line 2	South Johns Valley - Cedar Fork (Escalante RD)	230 kV	100.0	5.58	67.61
Garkane Power Association Line 1	Henrieville substation to Escalante via Upper Valley (Escalante RD)	69 kV	100.0	2.0	24.0
Garkane Power Association Line 2	Boulder Hydroelectric Plant to Escalante (Escalante RD)	69 kV	100.0	4.0	48.0

SOURCE: 2720 Case File Folders

[a] RD = Ranger District

TABLE B
EXISTING FEDERAL AND MAJOR STATE ROADS/HIGHWAYS

Name	Location	R/W Width (Feet)	Length (Miles)	Areas (Acres)
SR 18[a]	Enterprise to Central (Pine Valley RD[b])	132.0	12.00	192.0
SR 56	Cedar City to Beryl Junction (Pine Valley RD)	132.0	0.75	12.0
SR 14	Cedar City to SR 89 Junction (Cedar City RD)	132.0	24.00	384.0
SR 143	From SR 14 to Parowan (Cedar City RD)	132.0	4.00	64.0
US 89[c]	Long Valley Junction Areas (Cedar City RD)	132.0	2.25	36.0

Name	Location	R/W Width (Feet)	Length (Miles)	Areas (Acres)
SR 12	From SR 89 to SR 63 Junction, via Red Canyon (Powell RD)	200.0	7.0	17.0
SR 63	From SR 12 to Bryce Canyon National Park (Powell RD)	200.0	0.75	18.0
SR 12	From SR 63 to Escalante to Boulder Town via Upper Valley (Escalante RD)	200.0	4.0	97.0
Boulder-Grover	Boulder Town to Grover (Escalante & Teasdale RD's)	200.0	32.5	787.8

SOURCE: Forest Land Status and Road Atlas Record.

[a] SR = State Road.

[b] RD = Ranger District

[c] The US 89 crossings of the Forest is inventoried but will not be evaluated. Actual location of the ROW, in relation to the Forest boundary, is uncertain. Less than 36.0 acres of National Forest land are involved. Future utility line locations will be confined to the existing ROW on National Forest land.

PLANNING WINDOWS THAT WERE EVALUATED FOR POTENTIAL WINDOW DESIGNATION

An inventory of planning windows resulted in the following areas being identified for potential window designation:

1. Newcastle-Veyo (Pine Valley RD)
2. I-15[7] (Pine Valley RD)
3. Three Creeks[7] (Cedar City RD)
4. Hillsdale Canyon-Ahlstrom Hollow (Powell RD)
5. Johns Valley-Upper Valley[7] (Powell RD and Escalante RD)
6. Main Canyon-Widtsoe[7] (Escalante RD)
7. Escalante-Davis Flat Junction-Antimony (Escalante RD and Teasdale RD)
8. Escalante-Davis Flat Junction-Bicknell (Escalante RD and Teasdale RD)
9. Boulder Town-Capitol Reef National Park, via Garkane Hydroelectric Plant (Escalante RD and Teasdale RD)

[7] These potential window areas are part of energy transportation corridors discussed in the Kaiparowit Coal Development and Transportation Study, Final Report, August 1, 1980.

EXCLUSION AREAS

The following areas have been identified as exclusion areas:

1. Pine Valley Mountain Wilderness (Pine Valley RD)
2. Ashdown Gorge Wilderness (Cedar City RD)
3. Box-Death Hollow Wilderness (Escalante RD)

AREAS EVALUATED AS POTENTIAL AVOIDANCE AREAS

Descriptions of potential avoidance areas are based on Ranger District boundaries.

Potential avoidance areas are those National Forest System lands on each Ranger District that are not part of potential corridor/window areas and/or identified exclusion areas. Such lands will be given the name of the particular Ranger District where located.

EVALUATION CRITERIA

Factors used by the Forest to determine suitability of the inventoried rights-of-way and planning windows as designated corridors/windows are presented in this section. The same factors were also used to establish avoidance area designations.

The factors are:

1. Compliance with Federal, State and local land-use/land management plans and applicable Federal and State laws.

2. Reasonable mitigation would prevent unacceptable impacts to natural resources; including soil, water, fish, wildlife, vegetation, cultural resources, and visual quality.

3. Few or no physical restrictions on corridor/window placement or rights-of-ways placed therein would exist due to geology, hydrology, soil or land forms.

4. Existing and future right-of-way uses would be engineeringly and technologically compatible.

5. Reasonable mitigation would prevent unacceptable social and economic impacts to adjacent landowners and other groups or individuals.

6. Few, if any, potential health and safety hazards to National Forest users and the general public would result due to materials or activities within the right-of-way corridors/windows.

7. Off-road-vehicle administrative costs for right-of-way corridors would not exceed Forest budget constraints for alternative management programs.

8. Economic efficiency would be achieved by placing a right-of-way within a corridor/window. Consideration would be given to costs of construction, operation and maintenance, and costs of modifying or relocating existing facilities in a proposed corridor/window.

9. National Security risks would be minimized by location of proposed corridors.

EVALUATION PROCESS
Table C
Rights-of-Way
(Electrical Transmission Lines)

Evaluation Criteria	a Intermountain Power Project	b Utah Power & Light Co. Line 1	c Utah Power & Light Co. Line 2	d Garkane Power Association Line 1	e Garkane Power Association Line 2
1. Land Use/Management Plans and Laws	No conflicts.	Iron Mountain line segment from West Cedar Substation to New Castle, Utah has not been designated as a corridor by the BLM.	No conflicts.	No conflicts.	Would conflict with Forest highway corridor plan, which emphasizes protection of visuals and recreation values adjacent to the powerline.
2. Effects on Resource *Discussion on following resource areas/values where considered critical or sensitive. 1) Recreation/Visuals 2) Cultural 3) Wildlife/Fish 4) Timber 5) Soil/Vegetation 6) Water Quality 7) Minerals Note: A "no entry" for a particular resource under a particular ROW indicates that no major effects exist or would be anticipated.	1) Recreation/Visuals. No conflicts with recreation. Some visual concerns as related to powerlines being seen from Utah Highway 18	1) Recreation/Visuals. No conflicts with recreation. Some visual concerns as related to powerlines being seen from Utah Highway 18	1) Recreation/Visuals. -	1) Recreation/Visuals -	1) Recreation/Visuals. -see above statement on Land Use/Management Plan.
	2) Cultural. Right-of-way crosses ----- a through b -----> the old Spanish Trail. The Jefferson Hunt Memorial, the Hamblin Historical Townsite and Cemetery, The historical Holt Townsite, and the Mtn. Meadow Monument are all within one mile of the right-of-way. The area also contains some previously recorded prehistoric sites.	2) Cultural.	2) Cultural. Moderately high prehistoric values exist.	2) Cultural. Moderate prehistoric values.	2) Cultural. Low to moderate density of prehistoric values along ROW.
	3) Wildlife/Fish -	3) Wildlife/Fish Crosses important deer winter range on north end near Iron Mountain and on south end near Diamond Valley	3) Wildlife/Fish -	3) Wildlife/Fish Crosses winter range for deer and elk.	3) Wildlife/Fish Crosses the upper edge of key winter for deer and elk.
	4) Timber -	4) Timber -	4) Timber Important values along route.	4) Timber -	4) Timber -
	5) Soil/Vegetation -	5) Soil/Vegetation -	5) Soil/Vegetation Soils are shallow in ----------- c through e ----------> some areas of the existing route. Could be difficult to revegetate large area of disturbance.	5) Soil/Vegetation	5) Soil/Vegetation

EVALUATION PROCESS
Table C Contd'

	a	b	c	d	e
	6) Water Quality -	6) Water Quality -	6) Water Quality -	6) Water Quality -	6) Water Quality
--Minerals 7)	Minerals Area is leased for oil and gas.	7) ----- a through b ------>	Minerals Coal lease activities ongoing. Oil, gas and coal activities could be limited due to proximity of ROW and transmission lines.	7) Minerals Area of known coal deposits along route.	7) Minerals -
	Adverse effects to above resources could be mitigated.	----------------------	a through d	----------------------->	Adverse impacts to above resources, could not be completely mitigated
3. Geology, Hydrology, Soil, and Landform Restrictions	No conflicts.	No conflicts.	National Forest land on southern half of route characterized by steep slopes and incised side canyons. Slopes are susceptible to erosion during heavy rains.	Passes adjacent to steep sandstone walls. Slide are evident on these adjacent areas.	No major problems.
4. New and Existing Uses would be Engineeringly and Technologically Compatible	Location of new facilities would be constrained by the following: -Existing ROW facilities -Critical visual concerns -Adjacent historical sites. -Steep terrain in some areas. These four constraints could limit location of new facilities to existing ROW areas; engineering and technical compatibility problems could exist between new and existing uses if placed within existing ROW.	--- a through b --->	Steep restrictive terrain adjacent to ROW on southern half of route would cause compatibility problems.	No major problems ----------------	------------------------->
5. Socioeconomic	Decision to expand ROW width would affect adjacent private landowners since ROW passes near to and through some private land.	------ a through b----->	Expansion of the ROW width could adversely affect recreation qualities within the adjacent Bryce National Park.	Traffic delays could result during construction activities	Expansion of ROW could adversely affect recreation perception of the area.
6. Health and Safety Hazards to National Forest Users and General Public.	Some short-term hazards could result during the construction of ROW facilities.	------------------------------	a through e	------------------------------	------------------------------>

EVALUATION PROCESS
Table C Contd"

	a	b	c	d	e
	Few hazards would exist outside the ROW.				
7. Off-Road Vehicle Administrative Costs	No major changes would result in present off-road vehicle use.	---------- a through e ---------->			
8. Economic Efficiency of Constructing, Operating, and Maintaining ROW and Costs of Relocating	(Refer to Criterion No. 4) Existing ROWs are presently located along the most cost efficient routes, from initial construction, operation, and maintenance standpoint. Constraints, listed under Criterion No. 4 would limit expansion potentials and/or relocation of existing facilities.	----- a through b ----->	There would be poor economic efficiency and high costs to modify or relocate existing facilities outside the existing ROW on the southern portion.	No major problems.	There would be poor economic efficiency and high costs to modify facilities for scenic and recreation facilities.
9. National Security Risks	No conflicts.	---------- a through e ---------->			
10. Threatened or Endangered Species and Habitat	No conflicts.	---------- a through e ---------->			
11. Wetlands, Flood Plains and Riparian Areas	No conflicts.	---------- a through e ---------->			
12. Maximum Use of Existing ROWS	Parallels other powerline for 50 percent of length.	------- a through b ------->	No adjacent ROWs exist.	Parallels State Road 12 for 50 percent of length.	Parallels Boulder/Grover road for 50 percent of length.

EVALUATION PROCESS
Table D
Rights-of-Way
(Roads and Highways)

Evaluation Criteria	a SR 18 (Enterprise-Central)	b SR 56 (Cedar-Beryl Junction)	c SR 14, Cedar City to SR 89 Junction	d SR 143 SR 14 to Parowan	e US 89 Long Valley Junction Areas
1. Land Use/Management Plans and Laws	The State does not have a right-of-way across the N.F. for this highway. Coordination with UDOT during planning, design, construction and maintenance work for utilities and other transportation facilities within the road ROW would be advisable.	Approval and coordination would be required by State Department of Transportation (DOT) during planning, design, construction and maintenance work for utilities and other transportation facilities within the road ROW. Forest Service would also have to review and approve use.	These roads are existing, however, no formal easement has been granted for their occupancy of National Forest Lands. The Forest Service has informally agreed to recognize a 66 foot right-of-way in our management activities, including signing. A formal survey and USDA easement application would be required from the State to process the easement.		This ROW is not evaluated due to the small acreage involved, uncertainty of ROW location on National Forest land, and highly restrictive terrain features adjacent to Forest ROW portions. There are 3 US 89 crossings of Forest land in these areas. See Table F for corridor designation summary.
	Proposals outside portions of the ROW would conflict with Avoidance Area designation for the area being crossed.	Proposals outside ROW would conflict with Avoidance Area designation for the area being crossed.			
2. Effects on Resource	1) Recreation/Visuals. important scenic ------ values associated with travel zone.	1) Recreation/Visuals. a through b ------->	1) Recreation/Visuals. Critically important scenic values associated with the travel zone.	1) Recreation/Visuals.	
*Discussion on following resource areas/ values where considered critical or sensitive.	2) Cultural. Route passes near the Mountain Meadow Historical Monument.	2) -	Cultural. No Known effects -- c & d -->	2) Cultural.	2) Cultural.
1) Recreation/Visuals 2) Cultural 3) Wildlife/Fish 4) Timber 5) Soil/Vegetation 6) Water Quality 7) Minerals	3) Wildlife/Fish. -	3) Wildlife/Fish. -	3) Wildlife/Fish. Accesses important summer range for big game - important to recreation travel and viewing.	3) Wildlife/Fish.	
	4) Timber. -	4) Timber. -	4) Timber. Important values along ROWS.	4) Timber.	-
Note: A "no entry" for a particular resource under a particular ROW indicates that no major effects exist or would be anticipated.	5) Soils/Vegetation.	5) Soils/Vegetation.	5) Soils/Vegetation. Both highways cross unstable mass slumping sidehills, with active movement taking place during wet years.	5) Soils/Vegetation.	
	6) Water Quality. -	6) Water Quality. -	6) Water Quality. Traverses alongside Duck Creek pond and	6) Water Quality. -	

EVALUATION PROCESS
Table D Contd'

	a	b	c	d
			stream. Maintenance of water quality very important.	
	7) Minerals.	7) Minerals.	7) Minerals.	7) Minerals.
	Area is leased for oil and gas.	--- a through b --->	Crosses through an area of limestone in the eastern portion, which has been claimed for extraction by industry.	-
	Adverse effects to above resource could be mitigated.	----- a & b ----->	Adverse effects to above--c & d--> resources could not be completely mitigated.	
3. Geology, Hydrology, Soil, and Landform Constraints, Restrictions	No conflicts.	No conflicts.	Any excavation or improvement in the slump areas should be carefully designed, with advance approval required prior to construction. c & d	
4. New and Existing Uses would be Engineeringly and Technologically Compatible	Uses and areas of use would be limited in some areas by steep slopes.	No conflicts.	No conflicts.	No conflicts.
	No other major problems other than the traffic delays that would result during construction of utilities - - such as delays could be substantial.	------------------------------	a through d	------------------>
6. Health and Safety Hazards to National Forest Users and General Public	Hazards would exist during utility construction period.	------------------------------	a through d	------------------>
7. Off-Road Vehicle Administrative Costs	No major changes would result in present off-road vehicle use.	------------------------------	a through d	------------------>
8. Economic Efficiency of Constructing, Operating, and Maintaining ROW and Costs of Relocating	No major problems within existing ROW.	--------- a through b --->	Related of existing recreation facilities along ROWs would not be cost efficient or desirable. Snow accumulations would cause maintenance problems to ROW facilities. c & d.	
9. National Security Risks	Existing routes would pose no major problems to energy security.	---- a through b --->	Both Highways are important access routes to the FAA Blowhard Radar facility which is critically important to flight following and safety. c & d.	

EVALUATION PROCESS
Table D Contd'

	a	b	c	d
10. Threatened or Endangered Species and Habitat	No major problems within existing routes or on areas of possible expansion.	--------------------------------- a through d -------------------->		
11. Wetlands, Flood Plains and Riparian Areas	No conflicts.	No conflicts.	Important riparian area along Duck Creek.	No major problems.
12. Maximum Use of Existing ROWS	Meets criterion since actual transportation ROW would be fully or partially utilized, if used as utility ROWs.	--------------------------------- a through d -------------------->		

EVALUATION PROCESS
Table D Contd'

Evaluation Criteria	f SR 12, SR 89 to SR 63 via Red Canyon	g SR 63, SR 12 to Bryce Canyon N.P.	h SR 12, SR 63 to Escalante to Boulder Town via Upper Valley	i Boulder to Grover
1. Land Use/Management Plans and Laws	Approval and coordination would be required by State Dept. of Trans. during planning, design, construction and late for utilities and other transportation facilities within road ROW. F.S. would have to review and approve.		------ f through i ------>	
	Proposals outside ROW would conflict with avoidance areas.	---- f and g ---->		Proposals outside of ROW would conflict with avoidance area. Utility proposals would conflict with Dixie N.F. Highway Corridor Plan, which emphasizes protection of visuals and recreation values adjacent to the Highway. This Highway is being considered for scenic Highway status.
2. Effects on Resource Values *Discussion on following resource areas/values where considered critical or sensitive. 1) Recreation/Visuals 2) Cultural 3) Wildlife/Fish 4) Timber 5) Soil/Vegetation 6) Water Quality 7) Minerals	1) Recreation/Visuals. - Significant and important scenic values associated with travel zones. - Developed campground with a travel zone.	1) Recreation/Visuals. ------ f and g ---->	1) Recreation/Visuals.	1) Recreation/Visuals 1) Important scenic values associated with travel zone.
	2) Cultural No known Problems.	2) Cultural ------ f and g ---->	2) Cultural Potential for moderate density of prehistoric values outside of ROW.	2) Cultural ------ h and i ------->
	3) Wildlife/Fish. Crosses summer range for deer and elk.	3) Wildlife/Fish. ------- f and g ---->	3) Wildlife/Fish Crosses winter range for deer and elk.	3) Wildlife/Fish Crosses the upper edge of key winter range for deer and elk.
Note: A "no entry" for a particular resource under a particular ROW indicates that no major effects exist or would be anticipated.	4) Timber. Timber values primarily associated with key visual and recreation use.	4) Timber. -------- f and g ---->	4) Timber. Important values along ROW.	4) Timber. Important values along northern half of ROW.
	5) Soils/Vegetation. Soils in Red Canyon are unstable/considerable amount of natural geologic erosion--difficult to revegetate.	5) Soils/Vegetation. - No known problems	5) Soils/Vegetation. Soils exhibit considerable amounts of natural geologic erosion.	5) Soils/Vegetation. ------ h and i ------->

EVALUATION PROCESS
Table D Contd'

	f	g	h	i
	6) Water Quality. Disturbance would accelerate erosion and degrade existing water quality.	6) Water Quality. No known problesm	6) Water Quality. -	6) Water Quality. -
	7) Minerals. Moderate potential for oil and gas. Adverse effects to above resources could not be completely mitigated.	7) Minerals. --------- f and g --------->	7) Minerals. Areas of known coal deposits along route. Adverse effects to above resources could be mitigated.	7) Minerals. - Adverse effects to above resources could not be completely mitigated.
3. Geology, Hydrology, Soil, and Landform Restrictions	Red Canyon would be geologically restrictive to ROW expansion.	No known problems.	In some areas ROW passes adjacent to steep sandstone walls; slides are evident on these adjacent areas.	No major problems.
4. New and Existing Uses Would be Engineeringly and Technologically Compatible	Uses and areas of use would be limited from the head of Red Canyon to the "Pines" area.			
5. Socioeconomic Effects on Adjacent Landowners and Other Groups or Individuals	Vehicle transportation flows would be disrupted for substantial periods of time during construction of utilities and transportation facilities.	-- f through i -------------------->		There could be conflicts with those who consider the Highway as a scenic travel route---could adversely affect perception of the area.
6. Health and Safety Hazards to National Forest Users and General Public	Hazards would exist during utility construction period.	-- f through i -------------------->		
7. Off-Road Vehicle Administration	No major changes would result.	-- f through i -------------------->		
8. Economic Efficiency of Constructing, Operating, and Maintaining ROW and Costs of Relocating Existing Facilities in a Proposed Corridor	No major problems within existing ROW.	-------------------- f through h ----------------------->		Poor economic efficiency and high costs to modify facilities for scenic and recreation facilities.
9. National Security Risks	No major problems	--------------------------- f through h --------------------->		
10. Threatened or Endangered Species and Habitat	No known problems	--------------------------- f through h --------------------->		

EVALUATION PROCESS
Table D Contd'

	f	g	h	i
11. Wetlands, Flood Plains and Riparian Areas	ROW adjacent to important riparian areas. -------------	f and g ----->	No conflicts.	No major problems.
12. Maximum Use of Existing ROWs	Meets criterion, since actual transportation ROW would be fully or partially utilized, if used as utility ROWs.	--	f through i	--------------------------->

EVALUATION PROCESS
Table E
Planning Windows

Evaluation Criteria	a Newcastle-Veyo	b I-15	c Three Creeks	d Hillsdale Canyon Ahlstrom Hollow	e John Valley and Upper Valley Areas
1. Land Use/Management Plans and Laws	No known conflict.	Conflict with BLM and Washington County Planning. No corridors proposed or designated by BLM.	No known conflict.-------------------	-------------------	A Bureau of Land Management Wilderness Study Area (046-268) is located to the south of Table Cliff Plateau area.
		Corresponds to energy transportation windows discussed in the *Kaiparowits Coal Development and Transportation Study, Final Report, 1980*.	------------- b, c and e	-------------------------------	Same as b.
2. Effects on Resource Values	1) Recreation/Visuals. No conflicts with recreation. Some visual concerns as related to travelers on Utah Highway 18.	1) Recreation/Visuals. No conflicts with recreation. Some visual concerns as related to travelers on Interstate Highway 15.	1) Recreation/Visuals. Important/scenic values viewed from US 89 Highway.	1) Recreation/Visuals. Important/scenic valleys in East Fork Sevier River and the head of Wilson Canyon.	1) Recreation/Visuals. Important scenic areas in Johns Valley. Dispersed recreation over entire area.
*Discussion on following resource areas/values where considered critical or sensitive. 1) Recreation/Visuals 2) Cultural 3) Wildlife/Fish 4) Timber 5) Soil/Vegetation 6) Water Quality 7) Minerals	2) Cultural. Window Area contains portions of the Old Spanish Trail. The Jefferson Hunt Memorial, the Hamblin Historical Townsite and Cemetery, the historical Holt Townsite and the Mountain Meadow monument are all located within the area. It also contains some previously recorded prehistoric sites.	2) Cultural. No known conflicts.	2) Cultural. Significant values exist in vicinity.	2) Cultural. No known conflicts.	2) Cultural. Moderate density of prehistoric values on southern end of John's Valley and southwestern portion of Escalante R.D.
Note: A "no entry" for a particular resource under a particular ROW indicates that no major effects exist or would be anticipated	3) Wildlife/Fish. -	3) Wildlife/Fish. -	3) Wildlife/Fish. Crosses an important big game winter range.	3) Wildlife/Fish. Sagegrouse habitat in East Fork. Deer and elk winter range in Wilson Canyon.	3) Wildlife/Fish. Sagegrouse habitat and antelope, deer and elk winter range in Johns Valley. Important yearlong deer and elk habitat in Southernwestern portion of Escalante R.D.

EVALUATION PROCESS
Table E Contd'

	a	b	c	d	e
	4) Timber. -	4) Timber. -	4) Timber. -	4) Timber. -	4) Timber. Crosses prime timber areas in southwestern portion of Escalante R.D.
	5) Soil/Vegetation. -	5) Soil/Vegetation. -	5) Soil/Vegetation. Crosses a chained and reseeded areas important to range livestock; soils generally shallow.	5) Soil/Vegetation. Soils are sensitive and subject to high rates of erosion when disturbed.	5) Soil/Vegetation. Some problems with revegetation of disturbed soils in the Table Cliff area.
	6) Water Quality. -	6) Water Quality. -	6) Water Quality. -	6) Water Quality. Watershed values high in East Fork and Wilson Canyon.	6) Water Quality. -
	7) Minerals. Area is leased for oil and gas. Several mining claims located in northern end.	7) Minerals. Portion of area is leased for oil and gas.	7) Minerals. Possible oil and gas potential.	7) Minerals. Oil and gas potential along entire route.	7) Minerals. Coal lease activities with potential production in southwestern portion of Escalante R.D.
	Adverse effects to above resources could be mitigated.	------------------------------	------------------------------ a through e	------------------------------	------------------------------
3. Geology, Hydrology, Soil, and Landform Constraints, Restrictions	No major problems.	No major problems.	Stabilization problems on steep slopes.	Soils are sensitive to disturbance and erosion. Steep canyons and narrow canyon bottoms exist in Wilson Canyon.	Some steep canyons with slides and slumps in southwestern portion of Escalante R.D.
4. New and Existing Uses would be Engineeringly and Technologically Compatible	Location of new facilities would be constrained by the following; -Existing ROW facilities -Critical visual concerns -Adjacent historical sites. - Steep terrain in some areas. These four constraints could limit location of new facilities within the window area; engineering and technical compatibility problems could	Location of new facilities would be constrained by the following: -Critical visual concerns - Steep terrain in some areas. These two constraints could limit location of facilities within the window area.	No conflicts.	No conflicts.	Same as for Newcastle to Veyo Window in the southwestern portion of Escalante R.D.

EVALUATION PROCESS
Table E Contd'

	a	b	c	d	e
	exist between new and existing uses if placed within existing ROW widths.				
5. Socioeconomic Effects on Adjacent Landowners and Other Groups or Individuals.	Could affect adjacent private landowners since the window area includes private land in Mountain Meadow area.	Washington County Commission objects to this route as a corridor.	No known conflicts.	No known conflicts.	No major problems unless future planning on BLM land results in designated wilderness areas, i.e., BLM areas south of southwestern portion of Escalante R.D.
6. Health and Safety Hazards to National Forest Users and General Public	No major problems.	No major problems.	No major problems.	No major problems.	No major problems.
7. Off-Road Vehicle Administrative Costs	No major changes would result in present off-road vehicle use.	------------------------- a through d ---------------------------			Increase in costs could be expected due to lack of access.
8. Economic Efficiency of Constructing, Operating, and Maintaining ROW and Costs of Relocating	(Refer to Criterion No. 4.) Existing ROWs are presently located along the most cost efficient routes, from initial construction, operation, and maintenance standpoint. Constraints, listed under Criterion No. 4 would limit expansion potentials and/or relocation of existing facilities.	(Refer to Criterion No. 4.) No Existing ROW's within N.F. portion of window area.	Construction costs would be high in crossing drainages.	High construction costs in Upper Wilson Canyon due to rock and narrow valley bottoms. Severe winter weather conditions would increase construction operation, and maintenance costs.	Severe winter weather conditions would increase construction, operation and maintenance costs. Construction costs would be high in southwestern portion of Escalante R.D.
9. National Security Risks	No known problems. ------------------------------------- a through e --				
10. Threatened or Endangered Species and Habitat	No known habitat. -------- a through b ----->		Near Utah Prairie Dog habitat in Bear Valley.	Potential for several threatened plant species to occur in Wilson Canyon.	No known habitat.
11. Wetlands, Flood Plains and Riparian Areas	No conflicts. --------------- a through c ----------------			Some riparian ecosystem in canyon bottoms. Flooding from intense summer rain storms is probable.	Portions of the southwest areas of Escalante R.D. are subject to flash flooding.
12. Maximum Use of Existing ROWS	Two linear ROWs exist within the proposed window.	No existing ROWs within N.F. portion of window.	---- b and c -----	No through road or other ROWs exist within the proposed window.	Several through roads and high voltage powerlines are located within the proposed window area.

EVALUATION PROCESS
Table E Contd'

Evaluation Criteria	f Main Canyon-Widtsoe	g Escalante-Davis Flat Junction-Antimony	h Escalante-Davis Flat Junction-Bicknell	i Boulder Town-Capitol Reef N.P.
1. Land Use/Management Plans and Laws	No known conflicts.	The Bureau of Land Management Phipps-Death Hollow and North Escalante Outstanding Natural Areas are located immediately adjacent to the southern end of this proposed window area.	---------- g and h ---------	Bureau of Land Management Wilderness Study Area 040-061 and the BLM North Canyon Outstanding Natural Area are located immediately south of this proposed window area. National Park Service has disignated corridor to the east of the Forest.
2. Effects on Resource Values *Discussion on following resource areas/values where considered critical or sensitive.	1) Recreation/Visuals. There are important scenic values along total window area on N.F. land. A major traffic route exists in this area.	1) Recreation/Visuals. Important dispersed recreation values along northern half of route. Passes by one developed recreation area at Posy Lake. Scenic values high.	1) Recreation/Visuals. Important dispersed recreation values along northern half of route. Passes by one developed recreation area at Posy Lake. Scenic values high.	1) Recreation/Visuals Important scenic values along total length. Crosses near a scenic overlook.
1) Recreation/Visuals 2) Cultural 3) Wildlife/Fish 4) Timber 5) Soil/Vegetation 6) Water Quality 7) Minerals	2) Cultural. Low to moderate prehistoric values exist.	2) Cultural. -------------- f through h	2) Cultural. ----------------------	2) Cultural. Moderate to high density of prehistoric values exist.
Note: A "no entry" for a particular resource under a particular ROW indicates that no major effects exist or would be anticipated.	3) Wildlife/Fish.	3) Wildlife/Fish. Important deer, elk, antelope and sage-grouse habitat along entire route. Some fishery values in the area.	3) Wildlife/Fish. -------------- g and h -------------	3) Wildlife/Fish. Very important deer and elk yearlong habitat with area next to Capitol Reef N.P. and BLM lands as important winter habitat.
	4) Timber. Considered an important timber area along 75% of route. Provides major arterial access to timber stands.	4) Timber. Crosses important timber values along northern 3/4 of route.	4) Timber. ----------- g and h-------------	4) Timber. -
	5) Soil/Vegetation. Crosses areas of unstable soils in the Pink Cliffs areas, exhibiting high rates of natural geologic erosion.	5) Soil/Vegetation. -	5) Soil/Vegetation. -	5) Soil/Vegetation. Disturbed soils are difficult to revegetate.
	6) Water Quality. -	6) Water Quality. -	6) Water Quality. -	6) Water Quality. -

EVALUATION PROCESS
Table E

	f	g	h	i
	7) Minerals. -	7) Minerals. Oil and gas potential on northern half or route. Some exploration.	7) Minerals. ------------ g and h --------------	7) Minerals. Known uranium deposits next to Capitol Reef N.P.
	Adverse effects to above resources could be mitigated	------------	f through h ---------	Adverse effects to above resources could not be completely mitigated.
3. Geology, Hydrology, Soil, and Landform Restrictions	No major problems.	Some reasonably wet soils and bog areas.	----------- g and h --------------	Steep canyons and narrow canyon bottoms exist along total route. Loose sandy soils cover most of area.
4. New and Existing Uses Would be Engineeringly and Technologically Compatible	No major problems.	------------------------------	f through i -----------------------	
5. Socioeconomic Effects on Adjacent Landowners and Other Groups or Individuals	No major problems	------------------------------	f through i ------------------------	There could be social conflicts due to proximity of Capitol Reef N.P., conflicting with recreation user perception of the area. Could also conflict with BLM proposed wilderness study area, located to the south of the planning window.
6. Health and Safety Hazards to National Forest Users and General Public	No major problems. Few hazards would exist beyond the construction period.	------------------------------	f through h -----------------------	
7. Off-Road Vehicle Administration	Increased costs would result for any utility along the central portion of the route.	No major changes expected. --------------------	g through i	-------------------------
8. Economic Efficiency of Constructing, Operating, and Maintaining ROW and Costs of Relocating Existing Facilities in a Proposed Corridor	Severe winter conditions could cause increased operation and maintenance costs.	--------------------	f through h ----------------------	Steep terrain, and resource mitigation requirements would increase construction costs substantially.
		Some steep terrain and narrow canyon bottoms could increase construction costs.	------------ g and h----------------	
9. National Security Risks	No major problems.	-----------------------------	f through h ----------------------------	

EVALUATION PROCESS
Table E Contd'

	f	g	h	i
10. Threatened or Endangered Species and Habitat	Bald and Golden Eagle habitat. ------	------ Endangered plant spps. Castillya aquariums is found along the route.	------ f through i ------	------
11. Wetlands, Flood Plains and Riparian Areas	The western portion of the area is subject to flash flooding.	Some areas on southern ------ end subject to flash flooding. Northern area contains considerable riparian ecosystem around lakes and wet meadows.	------ g and h ------	Crosses some small riparian areas.
12. Maximum Use of Existing ROWs	Forest road ROW along entire length of window area.	Several Forest road ROWs ------ are located within the window area.	------ g and h ------	No linear ROWs exist within the window area.

10. Potential adverse impacts to threatened or endangered species or their habitats would not occur.

11. Acceptable mitigation could be formulated for disturbances to wetlands, flood plains, and all riparian areas.

12. Maximum use of existing electric transmission, pipeline and transportation routes would occur.

EVALUATION PROCESS

Each right-of-way route, "the existing right-of-way and terrain immediately adjacent to the right-of-way", and each planning window area was evaluated by analyzing how each of the 12 criteria would be met or affected under a corridor or window designation and eventual right-of-way use. The results of this analysis are shown in tables C through E.

The listed Avoidance Areas were also evaluated by applying the 12 criteria.

EVALUATION RESULTS - PROCEDURES AND RECOMMENDED DESIGNATIONS

Procedures

The analysis information from the EVALUATION PROCESS was used to:

1. Designate routes and areas as corridors, windows, or avoidance areas;

2. Establish widths of corridors and windows; and

3. Establish type of permitted energy right-of-way facility, i.e., underground, overhead, over-the-surface or a combination of the three.

Recommended Designations for Existing Linear Right-of-Way Routes and Planning Windows.

A Summary of the recommendation is presented as Table F, Recommended Designations for existing Electrical Transmission Lines, Road/Highway Routes, and Planning Windows.

The narratives on corridor and window designations, including widths and type of right-of-way address the recommended designations for existing electrical transmission line routes, State Road/Highway routes, and Planning Windows.

Recommended Designation for Avoidance Areas.

Application of the 12 Evaluation Criteria to the four geographical areas led to the following general statements concerning corridor and window designations:

Most (and in some cases all) locations within these areas would conflict with or not meet the goals and objectives for any one criterion; and reasonable mitigation would (for the most part) not prevent unacceptable impacts to natural, physical, or social resources and values located within and adjacent to the areas.

Note: With the exception of the Escalante Ranger District, all districts have State Highway/Roads within avoidance areas that meet the "Management Direction" for potential energy transportation and utility corridor designation. The above statements for avoidance areas would apply to these highway/road locations.

There are no other linear rights-of-way within the avoidance areas that meet the established Management Direction.

MANAGEMENT DIRECTION FOR EXISTING ELECTRICAL TRANSMISSION AND STATE ROAD/HIGHWAY ROUTES, PLANNING WINDOWS AND AVOIDANCE AREAS

(The following serves as a narrative backup to recommended Management Direction shown on table F.)

1. General Assumptions

a. The concerned counties and communities would support Dixie National Forest corridor and window designations. Such counties and communities might not agree on corridor and window widths as specified on National Forest lands and might, through negotiation and applicable authorized actions, set different widths on county property, or within community boundaries.

The State Department of Transportation and/or the Federal Highway Administration would approve of highway right-of-way encroachments proposed by project proponents.

b. Most of the Forest Service System Roads would be part of Avoidance Area designations.

c. Where applicable, Dixie National Forest corridor and window designations would be in harmony with such designations on adjacent Bureau of Land Management Land.

d. Proposals for overhead, underground, and over-the-surface energy transportation/transmission rights-of-way within the Table Cliff Proposed Research Natural Area, would be denied, unless the proposals were directly associated with the Kaiparowits Coal Field extraction, and then they would only be considered on a case-by-case basis.

2. Electric Transmission Line Routes (Assumptions, Recommendations, Mitigation, and Adjacent Lands)

a. Intermountain Power Project - IPP (Newcastle to Central), and

b. Utah Power and Light, Line 1 - (Cedar City to Newcastle to Central to St. George).

Table F Contd'

Evaluation Criteria	f Main Canyon Widtsoe	g Escalante-Davis Flat Junction-Antimony	h Escalante-Davis Flat Junction-Bicknell	i Boulder Town- Capitol Reef N.P.
Window Designation	Yes	Yes	No	No
Type of Facility	Overhead transmission facilities and over-the-surface railroad facilities.	Only one overhead transmission facility. Line size to be limited to ≤ 230 kv. If a line was structed to a size smaller than 230 kv, new proposals would require upgrading and uprating within the initial transmission line ROW. Underground pipeline facilities also allowed.	-	-
Width of Window	0.5 to 2.0 mile.	0.5 to 3.0 miles.	-	
Adjacent N.F. Land Designation	Escalante Ranger District --> Avoidance Area.			

TABLE F
3. Window Areas

	a	b	c	d	e
Evaluation Criteria	Newcastle-Veyo	I-15	Three Creeks	Hillsdale Canyon Ahlstrom Hollow	John Valley-Upper Valley-Main Canyon area
Window Designation	Yes	No	Yes	Yes	Yes
Type of Facility	Overhead and under transmission facilities.		Corridors for overhead, underground transmission facilities over-the-surface railroad facilities available within the window, however, the entire area is not available.	Overhead and underground transmission facilities.	Corridors for overhead, underground transmission facilities over-the-surface railroad facilities available within the window, however, the entire area is not available.
Width of Window Area	1.0 to 3.0 miles.		0.5 to 5.5 miles.	0.25 to 0.5 miles.	0.5 to 15.0 miles.
Adjacent N.F. Land Designation	Pine Valley Ranger District Avoidance Area.	-------------------->	Cedar City Ranger District Avoidance Area.	Powell Ranger District Avoidance Area.	Escalante Ranger District Avoidance Area and Table Cliff Proposed Research National Area.

TABLE F Contd'
2. Roads and Highways Contd'

Evaluation Criteria	f SR 12, US 89 to SR 63 via Red Canyon	g SR 63, SR 12 to Bryce Canyon N.P.	h SR 12, SR 63 to Escalante to Boulder Town via Upper Valley	i Boulder to Grover
Corridor Designation	No	No	SR 12 from SR 63 to Escalante is part of Johns Valley-Upper Valley Main Canyon Window Area Designation. (refer to Table F, Item 3.	No
Type of Facility	-	-	SR 12 from Escalante to Boulder Town---portion on N.F. will not be designated as a corridor.	-
Width of Corridor	-	-		-
Adjacent N.F. Land Designation	Within Powell Ranger -------------------------> District Avoidance Area.		(Adjacent N.F. land within Escalante Ranger District Avoidance Area.)	Within Escalante Ranger District Avoidance Area.

TABLE F Contd'
2. Roads and Highways

Evaluation Criteria	a SR 18 (Enterprise-Central)	b SR 56 (Cedar-Beryl Junction)	c SR 14, Cedar City to SR 89 Junction	d SR 143 SR 14 to Parowan	e US 89 Long Valley Junction Areas
Corridor Designation	Portion outside of Newcastle-Veyo Window Designation will not be a designated corridor. Refer to Table F, Item 3, for discussion on Newcastle-Veyo Window Area.	No	No	No	No
Type of Facility	-	-	-	-	
Width of Corridor	-	-	-	-	
Adjacent N.F. Land Designation	Portions outside of Newcastle-Veyo Window Areas. Designations are located in Pine Valley Ranger District Avoidance Area.	Within the Pine Valley Ranger District Avoidance Areas.	Within the Cedar City Ranger District Avoidance Areas.	-------------------------------------	----------->

SUMMARY OF RECOMMENDED DESIGNATIONS FOR EXISTING ELECTRICAL TRANSMISSION LINE, GAS PIPELINE, AND ROAD AND HIGHWAY ROUTES, AND PLANNING WINDOWS

TABLE F

1. ELECTRICAL TRANSMISSION LINE ROUTES

Evaluation Criteria	a Intermountain Power Project	b Utah Power & Light Co. Line 1	c Utah Power & Light Co. Line 2	d Garkane Power Association Line 1	e Garkane Power Association Line 2
Corridor Designation	Part of Newcastle to Veyo Window Designation.	A portion of this line is part of Newcastle-Veyo Window Designation. Portions of line near Iron Mountain will not receive a corridor designation.	Part of Johns Valley Window Area Designation. Refer to Table F, Item 3.	Part of Upper Valley Window Area Designation. Refer to Table F. Item 3.	No
Type of Facility		Portion of line near Diamond Valley will receive a corridor designation for overhead and underground transmission facilities.			
Width of Corridor		For Diamond Valley line portion, 500 foot inclusive of existing transmission line rights-of-way.			
Adjacent N.F. Land Designation		For Iron Mountain and Diamond Valley line portions, Pine Valley Ranger District avoidance area.		Avoidance Areas	Escalante Ranger District

Assumptions

For long-term (10-30 years) planning purposes, these routes could or would be a power transmission/distribution source, serving the electricity needs of St. George and other surrounding communities and a portion of the needs of the Los Angeles area. Future electrical transmission line proposals along these routes would be directly associated with these lines.

Recommendations

IPP Line. Support the existing right-of-way as part of a "window" designation in this portion of the Dixie NF.

UP&L, Line 1. Support a portion of the existing right-of-way as part of a "window" designation in this portion of the Dixie NF.

Support a corridor designation for the Diamond Valley portion of the Line.

The Diamond Valley line portions would be:

Suitable only for overhead and underground transmission facilities.

The Iron Mountain line portion, from West Cedar City Substation to Newcastle, Utah will not be classified as a corridor. A corridor designation would conflict with the BLM Cedar-Beaver-Garfield RMP/EIS.

General Mitigation Measures

IPP Line.

UP&L Line 1.

The following measures would apply to linear developments within the Diamond Valley Line portion:

The 500 foot wide right-of-way is inclusive of existing transmission line rights-of-way.

Expansion of access roads associated with existing right-of-way would not be allowed (no upgrading of roads), i.e., no widening or changing grades. If the access roads were part of existing or proposed Forest Road Development Systems, road expansion would be permitted.

Probable requirement for helicopter placement of towers or other energy transmission facilities in rough terrain.

Transmission lines would not be located over or through developed recreation sites.

Non-specular conductors and towers and compatible insulators would be required.

Dark tower bases would be required.

Line locations through forested areas would have varied widths and alignments, i.e., no long straight tangents, with tangents purposely widened beyond powerline needs in some areas to meet visual resource management objectives.

In addition to the above measures, those developed for the Intermountain Power Project (IPP) Environmental Impact Statement, dated July 1979, and the IPP Transmission Line Corridors Environmental Assessment, dated September 4, 1981, would be applied to electrical transmission line proposals.

Adjacent Lands

IPP Line.

UP&L Line 1 (existing right-of-way portion within a designated "window" area).

The Iron Mountain and Diamond Valley line portions are located immediately adjacent to the Pine Valley Ranger District Avoidance Area. Proposals in this Avoidance Area would be required to meet all site specific mitigation measures for the area, prior to acceptance and evaluation of applications.

c. Utah Power and Light Co. Line 2 (South Johns Valley-Cedar Fork); and

d. Garkane Power Association Line 1 (Henrieville to Escalante via Upper Valley.

Recommendations

Support the existing rights-of-way as part of a "window" designation in this portion of the Dixie NF.

e. Garkane Power Association Line 2 (Boulder Hydroelectric Plant to Escalante).

The Dixie National Forest powerline portion from Escalante to Boulder Town is located within the proposed Escalante Ranger District Avoidance Area. Proposal for overhead, underground, and over-the-surface facilities within or contiguous to this right-of-way would conflict with important visual and recreation resources in the avoidance area. The proposals would also adversely affect scenic geologic formations and land stability within the avoidance area. Energy transportation proposals along and/or contiguous to the powerline would be denied or discouraged. Proposal applications would not be accepted for evaluation unless all site specific mitigation measures for the avoidance area would be met.

3. Roads and Highways (Assumptions, Recommendations, Mitigation, and Adjacent Lands.)

a. State Road 18 (Enterprise-Central)

Recommendations

Support a portion of the existing right-of-way as part of a "window" designation in this portion of the Dixie NF. (See Pages which discuss applicable recommendations for the proposed Newcastle-Veyo Window designation.)

The Dixie NF right-of-way portion, located outside of the proposed window, will not be designated as a corridor. This road portion is located within the proposed Pine Valley Ranger District Avoidance Area. Proposals for overhead, underground, and over the surface facilities (within or contiguous to these right-of-way would be discouraged, due to critical and sensitive natural resources and potential engineering and administration difficulties. Energy transportation proposals would have to meet all site specific mitigation measures established for the avoidance area, prior to acceptance and evaluation of applications. (See EVALUATION PROCESS, Table D, for discussions on potential impacts from rights-of-way proposals.)

b. State Road 56 (Cedar City-Beryl Junction)

Recommendations

The Dixie NF road portion is located within the proposed Pine Valley Ranger District Avoidance Area. Utility proposals within or contiguous to this right-of-way would be discouraged, due to critical and sensitive natural resource values and potential engineering and administrative difficulties. Energy transportation proposals would have to meet all site specific mitigation measures established for the avoidance area, prior to acceptance and evaluation of applications. (See EVALUATION PROCESS, Table D, for discussions on potential impacts from right-of-way proposals.)

c. State Road 14 (Cedar City-State Road 89 Junction; and

d. State Road 143 (State Road 14-Parowan)

Recommendations

The Dixie NF road portions are located within the proposed Cedar City Ranger District Avoidance Area. Proposals for overhead, underground, and over-the-surface facilities within or contiguous to these rights-of-way would conflict with important recreation and visual and timber resources located in the adjacent avoidance area. The proposals would also adversely affect scenic geologic formations and land stability within the avoidance area. Energy transportation proposals along and/or contiguous to the avoidance area road portions would be discouraged or denied. Proposal applications would not be accepted for evaluation unless all site specific mitigation measures for the avoidance area would be met. (See EVALUATION PROCESS, Table D, for discussions on potential impacts from right-of-way proposals.

e. US Highway 89 (Long Valley Junction Area)

Recommendations

The Highway 89 crossings through the Forest are in highly restrictive terrain with sensitive visual concerns. A corridor designation would conflict with existing road transportation needs and scenic values.

The highway crossings are located in both the proposed Cedar City Ranger District Avoidance Area and private holdings. Energy transportation proposals for locations within the avoidance area would adversely affect scenic values and land stability. Such proposal applications would be discouraged or denied. Applications would not be accepted for evaluation unless all site specific mitigation measures for the avoidance area would be met. (See EVALUATION PROCESS, Table D, for discussions on potential impacts from right-of-way proposals.

f. State Road 12 (US Highway 89 to State Road 63 via Red Canyon)

g. State Road 63 (State Road 12 to Bryce Canyon)

Recommendations

The Dixie NF road portions are located within the proposed Powell Ranger District Avoidance Area. Proposals for overhead, underground, and over-the-surface facilities within or contiguous to these rights-of-way would conflict with the planning direction for the Red Canyon Recreation area and important recreation and visual resources located in the adjacent avoidance area and nearby Bryce Canyon National Park. The proposals would also adversely affect scenic geologic formations and land stability within the avoidance area. Energy transportation proposals along and/or contiguous to the road portions would be denied or discouraged. Proposal applications would not be accepted for evaluation unless all site specific mitigation measures for the avoidance area would be met. (See EVALUATION PROCESS, Table D, for discussion on potential impacts from right-of-way proposals.

h. State Road 12 (From junction of State Road 63 to Boulder, via Upper Valley)

Recommendations

Support the existing right-of-way from the junction fo SR 63 to Escalante as part of a "window" designation in this portion of the Dixie NF. (See discussion applicable recommendations for the proposed Johns Upper-Valley Window designation.)

The Dixie National Forest road portion from Escalante to Boulder Town is located within the prepared Escalante Ranger District Avoidance Area. Proposals for overhead, underground, and over-the-surface facilities within or contiguous to this right-of-way would conflict with important visual and recreation resources in the avoidance area. The proposals would also adversely affect scenic geologic formations and land stability within the avoidance area. Energy transportation proposals along and/or contiguous to the road would be denied or discouraged. Proposal applications would not be accepted for evaluation unless all site specific mitigation measures for the avoidance area would be met.

i. Boulder to Grover Highway

Assumptions

A corridor designation could conflict with Bureau of Land Management analysis of adjacent and contiguous Wilderness Study Area 040-061 and North Canyon Outstanding Natural Area.

Recommendations

The Dixie NF road portion is located within the proposed Teasdale and Escalante Ranger District Avoidance Areas. Proposals for overhead, underground, and over-the-surface facilities within or contiguous to this right-of-way would adversely affect important recreation and visual resources located in the adjacent avoidance areas. The proposals would also adversely affect scenic geologic formations and land stability within the avoidance areas. Energy transportation proposals along and/or contiguous to the road portion would be denied or discouraged. Proposal applications would not be accepted unless all site specific mitigation measures for the avoidance areas would be met. (See EVALUATION PROCESS, Table D, for discussions on potential impacts from right-of-way proposals.

4. Window Areas (Assumptions, Recommendations, Mitigation Measures, and Adjacent Lands)

a. Newcastle-Veyo

Assumptions

For long-term (10 to 30 years) planning purposes, this window would meet the demand for a major north/south energy transportation corridor in southwestern Utah.

Recommendations

Support a window designation.

Window suitable for overhead and underground electrical transmission and underground pipeline facilities.

Width of window would vary from one to three miles.

General Mitigation Measures

Expansion of access roads associated with existing rights-of-way would not be allowed (no upgrading of roads), i.e., no widening or changing grades. If the access roads were part of existing or proposed Forest Road Development Systems, road expansion would be permitted.

Probable requirement for helicopter placement of towers or other energy transmission facilities in rough terrain.

Transmission lines would not be located over or through developed recreation sites.

Non-specular conductors and towers and compatible insulators would be required.

Dark tower bases would be required.

Line locations through forested areas would have varied widths and alignments, i.e., no long straight tangents, with tangents purposely widened beyond powerline needs in some areas to meet visual resource management objectives.

In addition, those developed for the IPP Environmental Impact Statement, dated July 10, 1979, the IPP Transmission Line Corridors Environmental Assessment, dated September 4, 1981, and the Rocky Mountain Pipeline Project Environmental Impact Statement, dated December 1981 would be applied to electrical transmission line and underground pipeline proposals.

Adjacent Lands

Adjacent lands, administered by the Dixie National Forest, are associated with two corridor classification areas:

(1) Pine Valley Mountain Wilderness Exclusion Area.

(2) Pine Valley District Avoidance Areas.

Energy transportation proposals for locations outside the window area and within the exclusion area would be denied. For areas outside the window area and within the avoidance area, proposals would be considered on a case-by-case basis. Such proposals would be required to meet all site specific mitigation measures established for the avoidance area, prior to acceptance and evaluation of applications.

b. Interstate 15

Assumptions

A corridor designation would conflict with Bureau of Land Management planning decisions, which rejected a corridor on BLM administered lands along interstate I-15. A coridor designation could also conflict with Washington County Commission decisions, which also rejected utility proposals along or contiguous to I-15.

Recommendations

Proposals for overhead, underground, and over-the-surface facilities contiguous to this right-of-way would be denied and/or discouraged. This would be in support of BLM and Washington County planning decisions.

The National Forest land adjacent to this right-of-way would be the same as discussed for the Newcastle-Veyo Window area.

c. Three Creeks

Assumptions

For long-term (10 to 30 years) planning purposes, this window would meet the requirements for railroad transport facilities as addressed in the Kaiparowits Coal Development and Transportation Study, dated January 19, 1980.

Recommendations

Support a window designation.

Overhead and underground electrical transmission, underground pipeline, and railroad corridors are available within the window, however, the entire aea is not available.

Width of the window would vary from 0.5 to 5.5 miles.

General Mitigation Measures

Same as for item 4a Newcastle-Veyo. In addition, those measures developed for the Kaiparowits Coal Development and Transportation Study, dated January 19, 1980, would be applied to electrical transmission line, underground pipeline, and railroad proposals.

Adjacent Lands

Adjacent lands are located in the Cedar City Ranger District Avoidance Areas. Proposals would be required to meet all site specific mitigation measures for the avoidance area, prior to acceptance and evaluation of applications.

d. Hillsdale Canyon-Ahlstrom Hollow

Recommendations

Support a window designation.

Window suitable for overhead and underground electrical transmission and underground pipeline facilities.

Width of the window would vary from 0.25 to 0.5 miles.

General Mitigation Measures

Expansion of access roads associated with the window area would not be allowed (no upgrading of roads), i.e., no widening or changing grades. If the access roads are part of existing or proposed Forest Road Development Systems, road expansion would be permitted.

Over-the-surface vehicle use would be recommended when temporary window access was needed. Over-the-surface vehicle use would be considered prior to permitting actual construction of temporary access roads. If temporary access road construction was permitted, road prisms would be restored to original contours and revegetated.

Probable requirement for helicopter placement of towers or other energy transmission facilities in rough terrain.

Transmission lines would not be located over or through developed recreation sites.

Non-specular conductors and towers and compatible insulators would be required.

Light-colored tower bases would be required.

Line location through forested areas would have varied widths and alignments, i.e., no long straight tangents, with tangents purposely widened beyond powerline needs in some areas to meet visual resource management objectives.

Proposals would be required to follow specific clearing and alignment specifications as per Forest direction.

No wet meadows would be crossed.

Revegetation measures would involve using native or indigenous species required by the Forest Service.

Adjacent Lands

Adjacent lands are located within critical/sensitive resource areas of the Powell Ranger District Avoidance Area. Energy transportation proposals within this area would adversely affect important visual resources (including scenic geologic formations), soil and watershed values, and land stability. Such proposals would be denied or discouraged; proposal applications would not be accepted for evaluation unless all site specific mitigation measures for the avoidance area would be met.

e. Johns Valley-Upper Valley

Assumptions

The window would meet the demand for a major north/south energy transportation corridor in south-central Utah, serving both electrical transmission and coal transport planning needs for the next 30 years.

Energy transportation proposals in this window area would not cross into or through Bryce Canyon National Park and/or the Bureau of Land Management Wilderness Study Area (046-268).

Recommendations

Support a window designation.

Overhead and underground electrical transmission, underground pipeline, and over-the-surface railroad corridors are available within the window, however, the entire area is not available.

Width of the window would vary from 0.5 to 5.0 miles.

General Mitigation Measures

Same as for item 4d Hillsdale Canyon-Ahlstrom Hollow window.

In addition, these measures developed for the Kaiparowits Coal Development and Transport Study, dated January 19, 1980, would be applied to railroad proposals.

Adjacent Lands

Adjacent lands are located within critical/sensitive resource areas of the Powell and Escalante Ranger District Avoidance Areas. Adjacent lands are also located within northern portions of Bryce Canyon National Park and a Bureau of Land Management Wilderness Study Area, i.e. "The Blues", No. 046-268.

Energy transportation proposals within these areas would adversely affect important recreation and visual resources, soil and watershed values and land stability. The Forest Service would not process proposals on National Forest land that crossed into or through National Park and/or Wilderness Study Area lands. Energy transportation proposals affecting the Forest Service avoidance areas would be denied or discouraged; proposal applications would not be accepted for evaluation unless all site specific mitigation measures for the avoidance areas would be met. (See EVALUATION PROCESS, Table D, for discussions on potential impacts from right-of-way proposals.

f. Main Canyon-Widtsoe

Assumptions

Since this area presently serves as a well traveled road access route from Escalante Valley to the north, utility companies could propose major linear facilities adjacent to the road system.

Recommendations

Support a window designation.

Window suitable for overhead electrical transmission and over-the-surface railroad facilities.

Width of the window to vary from 0.5 to 2.0 mile.

General Mitigation Measures

Same as for item 4e Johns Valley-Upper Valley-Main Canyon Window.

Adjacent Lands

Adjacent lands are located within the southwestern portion of the Escalante Ranger District Avoidance Area. Previous discussions for this area (under 4e Johns Valley-Upper Valley-Main Canyon window area) would also apply to these adjacent lands.

g. Escalante-Davis Flat Junction-Antimony

Assumptions

This window area would meet Garkane Power Association Inc.'s 10 to 30 year requirements for electrical transmission system planning. The window would also meet the requirements for electrical transmission system planning, associated with the Escalante CO_2 well field development.

Recommendations

Support a window designation.

Window suitable for ONE overhead electrical transmission facility. Line size would be limited to less than or equal to 230 kv.

Upgrading, uprating, and/or addition of facilities would only be permitted within the INITIAL transmission line right-of-way.

Underground pipeline facilities also permitted.

Width of window to vary from 0.5 to 3.0 miles.

General Mitigation Measures

Same as for item 4d Hillsdale Canyon-Ahlstrom Hollow Window.

Adjacent Lands

Previous discussions for the Escalante Ranger District Avoidance Area also apply to this window area.

h. Escalante-Davis Flat Junction-Bicknell

Assumptions

Based on information received from Garkane Power Association Inc., this window would take second priority to that of the Escalante-Davis Flat Junction-Antimony window. The Bicknell window portion would be less acceptable to Garkane than the Antimony window portion for short-term planning purposes, i.e., 10 years ±. Garkane would favor electrical transmission system development from the Antimony area to potential CO_2 well field developments north of Escalante, Utah. The Bicknell window portion could eventually serve as a route for providing transmission system reliability for long-term system planning; this window portion might not be utilized until power needs in southcentral Utah warranted local high voltage transmission lines.

It is assumed that the Escalante-Davis Flat Junction-Antimony Window could also serve as a route for providing system rehabilitation for long-term system planning.

Recommendations

This planning window will not be designated as a window. The Dixie National Forest will require that future transmission facilities, originating north of Escalante, Utah, and traveling south to the Escalante area be located in one of three designated windows, i.e., Johns Valley-Upper Valley, Main Canyon-Widtsoe, or Escalante-Davis Flat Junction-Antimony.

This area will be classified as part of the Teasdale and Escalante Ranger District Avoidance Areas.

i. Boulder Town-Capitol Reef National Park

Assumptions

A window designation could conflict with Bureau of Land Management analysis of adjacent and contiguous Wilderness Study Area 040-061 and North Canyon Outstanding Natural Area.

Recommendations

Notwithstanding an adjacent Capitol Reef National Park utility corridor designation, the Dixie National Forest will not designate this planning window as a window. Utility proposals within this area would adversely affect important recreation and visual resources. Scenic geologic formations and land stability would also be adversely affected. Energy transportation proposals would be denied or discouraged; proposal applications would not be acceptable for evaluation unless all site specific mitigation measures for the avoidance areas would be met. (See EVALUATION PROCESS, Table D, for discussions on potential impacts from right-of-way proposals.

SCHEDULE FOR REVIEW OF WITHDRAWALS - DIXIE NF

(Must be completed by no later than 1991,
when all withdrawals not reviewed will be rescinded.)

FY YEAR	SERIAL NO.	DESCRIPTION	ACRES	DISTRICT
1985	U-0146355	Job Corps Center, Powell Conservation Ctr.	140	D-3
	U-42835	1 Administrative Site	40	D-1
	U-42838	2 Administrative Sites	690	D-2
	U-42847	1 Administrative Site	320	D-3
1986	U-010084	21 Admin. Sites & 23 Recreation Areas	7,519	All
	U-42857	1 Administrative Site	127	D-1
	U-42862	1 Administrative Site	35	D-2
	U-42865	1 Administrative Site	5	D-1
	U-54613	2 Administrative Sites:		
		Clayton GS	35	D-4
		Wildcat GS	33	D-5
1987	U-42853	1 Administrative Site	160	D-5
1988	U-42873	1 Administrative Site	8	D-4

Regional Direction Concerning Minerals (Regional Guide for the Intermountain Region dated January 1984)

1. Provide a maximum land base for minerals/energy prospecting, leasing, and development through conservative use of: 1) withdrawal authority, 2) overly restrictive surface use stipulations, and 3) management constraints.

2. Respond to notices of intent, plans of operations, lease offers, prospecting permits, and applications for leasable and salable minerals within the time limits prescribed by law, regulation, and agency direction.

3. Consider surface resource protection. Assure that stipulations in leases, clauses in permits, and conditions of approval to operating plans are consistent with these needs.

4. Coordinate transportation system needs with oil, gas, and coal, and with other leasable and locatable development needs.

5. Enhance recreation opportunities, wildlife habitat, or other resource values through innovative mitigation measures.

6. Emphasize common variety development and reclamation of abandoned mining areas.

7. Work with Federal and State Agencies and public utility companies to plan, coordinate, and integrate energy production, transmission facilities, and transportation needs with current and foreseeable uses of other National Forest resource values.

8. Recognize the increased level of social and economic effects as a result of market demands.

INTERAGENCY AGREEMENT
BETWEEN
THE BUREAU OF LAND MANAGEMENT
AND
THE FOREST SERVICE
FOR
MINERAL LEASING

The Bureau of Land Management (BLM), Department of the Interior, and the Forest Service (FS), Department of Agriculture, hereby agree that the policy and procedures set forth in this Interagency Agreement (IA) shall be followed with respect to the processing of authorizations, such as licenses, permits, and leases, that grant rights to federally owned minerals in the National Forest System (NFS) and in adjoining lands with Federal minerals (split estate lands). Such authorizations are collectively referred to in this IA as leases. This agreement does not include permits issued by the FS to do preliminary mineral-related investigations or surveys.

I. AUTHORITIES

The BLM manages the Federal leasable mineral estate under authority of the Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351-359), the Geothermal Steam Act of 1970 (30 U.S.C. 1001 Et seq), Section 402 of Reorganization Plan No. 3 of 1946 (5 U.S.C. Appendix), the Federal Coal Leasing Amendments Act of 1976 (90 Stat. 1083), and other Acts.

The FS manages the NFS for multiple use and sustained yield of products and services and is authorized to make rules and regulations to govern surface use and occupancy under the authority of the Organic Administration Act of 1897 (16 U.S.C 473-475, 477-482, 551), the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C 528 (note), 528-531), and the National Forest Management Act of 1976 (90 Stat. 2949). Under certain statutes the FS has consent authority for leasing of the NFS. Also, in accordance with 43 CFR 3101.7 and through long standing agreement between the Departments, the FS provides recommendations where consent authority does not exist.

II. PURPOSE

This IA establishes the policy and procedures by which leasing proposals which involve the NFS and adjoining private lands with Federal minerals are to be processed by the BLM and the FS. This policy and these procedures are adopted to ensure cooperative, timely, and efficient action by the BLM and the FS with respect to such leasing, consistent with the statutory and regulatory responsibilities of each agency.

III. RESPONSIBILITIES

A. NEPA Compliance and Coordination. Issuance of leases by the BLM is a Federal action which requires an environmental analysis to be made in conformance with the National Environmental Policy Act of 1969 (NEPA), its implementing regulations (40 CFR 1500-1508), and agency direction. In order to comply with these requirements in an efficient and effective manner, both agencies will participate jointly in scopping each proposed action. A single environmental analysis and, if appropriate, a single document is to be completed such that it will be an adequate environmental basis for all recommendations and/or decisions to be made by either the FS or the BLM.

For leasing proposals which primarily involve the NFS or adjoining private lands with Federal minerals and which primarily involve NFS issues, the FS will have the lead for environmental analysis and, when necessary, documentation in an environmental assessment or environmental impact statement. For leasing proposals which involve primarily non-NFS lands or issues, the participation of each agency in environmental analysis and documentation will be determined during scoping. In all cases, FS expertise will be recognized for that portion of any analysis or document concerning protection and utilization of the NFS.

B. Stipulation Development and Use. The BLM and the FS will coordinate the development of stipulations in conjunction with NEPA compliance at the local level to ensure appropriate wording and to ensure that adequate justification for their use exists in the record. The BLM and the FS will coordinate agency-wide stipulation use policy at the Washington level.

C. Agency Decisions. Leasing decisions are to be coordinated by the BLM and the FS so that requirements identified through the environmental analysis and, if appropriate, the environmental document are considered in FS recommendations (including those pertaining to adjoining private lands with Federal minerals) and/or consent decisions and in subsequent BLM leasing decisions. Coordination with respect to FS recommendations and/or decisions is to be such that FS is aware of final action to be taken by BLM.

1. Recommendations. When the FS role in the leasing decision is limited to providing the BLM with advisory, nonbinding recommendations, the FS will forward its recommendations to BLM as to the leasing of the NFS and adjoining private lands with Federal minerals.

2. Consent. When the decision requires consent of the FS for the leasing of the NFS, the FS shall notify affected parties of its decision. After expiration of the FS appeal period, the FS shall forward its decision to BLM. When the FS provides recommendations for adjoining private lands with Federal minerals or recommendations involving non-NFS lands or authorities within its decision, they are to be so identified.

D. Appeal Coordination. To the extent that potential leasing of the NFS and of adjoining private lands with Federal minerals involves only FS recommendations, FS actions are not subject to appeal to the FS. However, to the extent that such leasing of the NFS requires FS consent, FS decisions are subject to appeal to the FS under 36 CFR 211.18. If a decision is appealed, the FS will promptly notify the BLM.

All BLM decisions, subsequent to either FS recommendations or consent decisions, are then subject to protest to BLM and/or appeal under 43 CFR 4. The BLM will promptly notify the FS if a BLM decision affecting a lease proposal of the NFS is protested or appealed.

E. General Program Coordination.

1. The BLM will review proposals for leases prior to forwarding them to the FS to ensure compliance with applicable regulations. The BLM will forward acceptable proposals to the FS within 15 days of receipt with a request for a FS recommendation and/or consent decision and, if acquired minerals are proposed for leasing, a request for a title report.

2. Within 30 days of FS receipt of a leasing proposal, the BLM and the FS will, if necessary, scope the proposal.

3. The FS will forward its recommendation and/or consent decision within 60 days of the initial receipt by the FS of the leasing proposal, or will provide the BLM with a date to expect a response giving the reason for such delay.

4. The BLM State Director and the FS Regional Forester will attempt to resolve differences concerning FS leasing recommendations or differences involving specific leasing procedures. Differences which cannot be resolved will be forwarded promptly to the BLM Director and the FS Chief for resolution.

5. The BLM will close a case by either issuing a lease or rejecting an offer within 60 days of receipt of FS recommendations or consent decisions.

6. The BLM will provide the FS information relative to changes in the status of offers, licenses, permits,and leases within 10 days of the change.

7. The BLM and the FS will incorporate the policies and procedures set forth in this agreement into their respective manual systems. The BLM and the FS will coordinate and share at the local and national level manual releases, policy memoranda, and directives affecting the respective leasable mineral programs.

8. The BLM and the FS will coordinate the preparation of budget proposals for leasable minerals at the national level to ensure that data and information are consistent and that major projects, such as coal leasing plans, are appropriately considered in the budgets of both agencies. The BLM and the FS will coordinate work plans at the State Director/Regional Forester level and, with respect to NEPA compliance for leasing of split estate lands, will notify respective Washington Offices when substantial costs will be incurred.

IV. SUPPLEMENTAL AGREEMENTS

The BLM State Directors and the FS Regional Foresters are encouraged to enter into supplemental agreements consistent with this IA in order to implement local procedures which will contribute to the cooperative, timely, and orderly processing of mineral leasing proposals. A copy of supplemental agreements will be forwarded to the BLM Director and the FS Chief for information.

V. EFFECT ON PRIOR AGREEMENTS

This IA supersedes the following interagency agreements, in whole or in part as indicated, as they relate to the processing of mineral leasing proposals. A copy of supplemental agreements will be forwarded to the BLM Director and the FS Chief for information.

1. Sections III, IV, and V of the Cooperative Agreement Between Forest Service (USDA) and the Geological Survey (USDI) for Operation Within Solid Mineral Permits and Leases on National Forest System Lands, dated November 1980, are superseded.

2. The Interim Memorandum of Understanding Between the Bureau of Land Management and the Forest Service, dated December 1980, is superseded in its entirety.

3. Sections I.A., I.B., III.A., and III.B., of the Memorandum of Understanding for the Geothermal Program between the U.S. Geological Survey - Bureau of Land Management - USDA, Forest Service, dated December 1981, are superseded.

VI. AGREEMENT REVIEW

Within 1 month prior to the anniversary date of this IA, the FS Regional Foresters and the BLM State Directors shall appraise their respective Washington Offices of suggested modifications, if any, to this agreement which would contribute to the cooperatively, timely, and orderly processing of mineral leasing proposals. These suggestions will be reviewed by the BLM Director and the FS Chief to determine if the IA should be amended.

for
/s/ F. Dale Robertson
Chief, Forest Service

6/19/84
Date

for
/s/ James Al Parker
Director, Bureau of Land Management

6/19/84

UNSUITABILITY CLASSIFICATION OVERVIEW

As required by the Surface Mining Control and Reclamation Act of 1977 (SMCRA): and the Memorandum of understanding between USDA-USDI 5/20/80; the lands on the Dixie National Forest having high and moderate potential for coal development as identified by U.S. Dept. of Interior must be evaluated against the criteria for unsuitability. The criteria are found in 43 CFR 3461. The following is a summary of this evaluation.

RESULTS OF THE COAL UNSUITABILITY STUDY

I. LAND CLASSIFICATION OF STUDY AREA	ACRES
Lands identified by the Minerals Management Service as having high and moderate potential for coal production.	32,801
PRLA area outside lands designated by MMS as having high and moderate potential for coal production.	7,299
TOTAL SIZE OF THE STUDY AREA =	40,100
Less land with private surface and private minerals (land not studied.)	120
NET SIZE OF THE STUDY AREA =	39,980

II. RESULTS OF APPLYING THE UNSUITABILITY CRITERIA AND THE SOUTHERN UTAH COAL PETITION DECISION TO THE STUDY AREA

NOTE: The following acreages are not exclusive and some acreages may be used in several criteria.

Criterion No. 1 - Lands in Study Area not having "Significant Forest Cover" but having significant Recreation or other values and, therefore, unsuitable.	5,264
Lands in Study Area having "Significant Forest Cover" and therefore unsuitable for surface mining.	34,716
Criterion No. 2 - Rights of way or easements.	6
Criterion No. 3 - Lands within 100 feet of the right-of-way of a Public road.	122
Criterion No. 7 - Lands having historic or cultural significance.	621
Criterion No. 11 - Eagle nest or site determined to be active.	50
Criterion No. 15 - Fish and wildlife habitat for high interest species.	4,553
Criterion No. 16 - Floodplains.	660

CONCLUSION

*Lands suitable/available for underground mining with stipulations and/or reservations on a case-by case basis---------------------- 39,970

Lands suitable/available for surface mining (stripmining), located in E1/2, NE1/4, Section 36, T36S, R1E, SLB&M ---------------------------10

STUDY AREA TOTAL------------39,980

IMPORTANT FOOTNOTES:

*Except for those areas affected by the decision on the Southern Utah Petition, all areas within the Coal Unsuitability Study Area can be considered available for leasing where surface operations and impacts are incident to an underground coal mine. Each underground leasing proposal will be evaluated on a case-by-case basis to weigh significant recreational, timber, economic and related values and to provide for mitigation of adverse effects. In the areas affected by the Southern Utah Petition, leasing must be in accord with the Secretary of the Interior's decision of December 16, 1980. In the coal Unsuitability Study Area, this decision affects 5,704 acres.

Surface coal mining operations, as defined in 43 CFR 3400.0-5(mm), means ..." activities conducted on the surface of lands in connection with a surface coal mine or surface operations and surface impacts incident to an underground mine as defined in Section 702(28) of the Surface Mining Control and Reclamation Act, 30 U.S.C. 1291(28)."

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